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Telephony.

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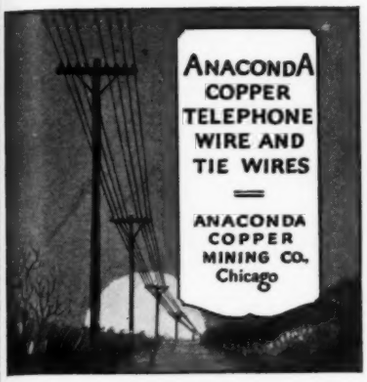

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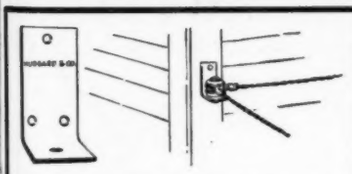
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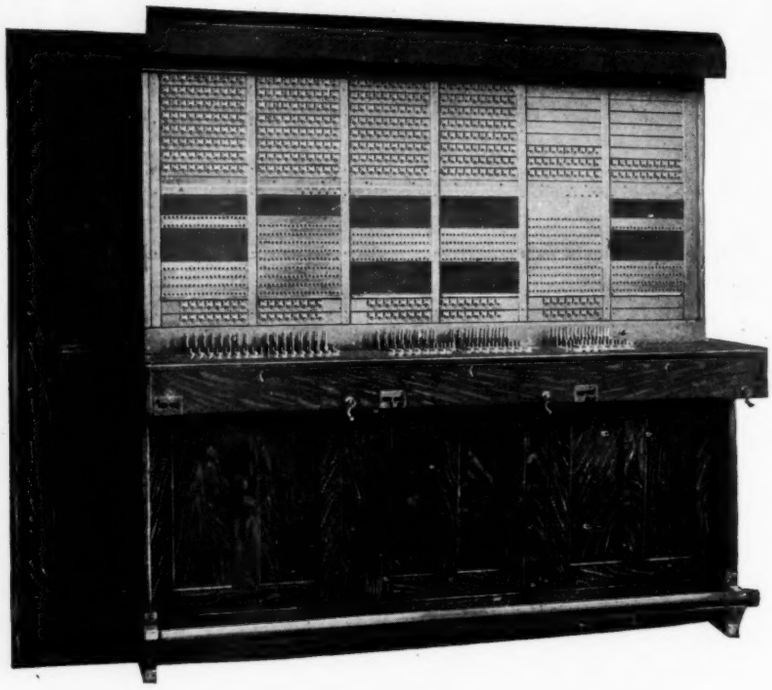

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CURRENT OPINIONS AND COMMENTS

When Congress re-assembles — and that will be much sooner than business men wish—there will be a rush to tinker with the tax laws. The radicals and the demagogues will try to boost the income tax rates, reinstate the excess profit taxes and do many other things to harass business, while the conservatives will try to lighten the tax burden and give industry a better chance to recuperate.

The war tax on telephone toll messages is one of the taxes that should be abolished, and the telephone men should start right in now to do some campaign work with their congressmen. Several state telephone associations have declared for its repeal, and the national convention in Chicago last month endorsed the idea by adopting a resolution urging the removal of this tax at the coming session.

* * * *

The tax on telephone tolls was imposed as a war measure, and the operating companies have gladly coöperated with the government in its collection. There is no doubt the tax has, in some degree, affected the toll business; certainly its collection and the keeping of records have entailed a lot of work on the part of the companies for which they received no compensation.

The war is over now and the tax should be removed. Similar taxes in other lines of business have been abolished, to satisfy their natural demand for relief, and the same justice should be shown the telephone industry.

It is noted that the Chamber of Commerce of Kansas City has declared in favor of the repeal of the telephone toll tax, showing that business men are in sympathy with the movement. This is an effective way to accomplish results, and it would help materially if telephone men generally would interest their patrons to join in a petition to Congress urging that the toll tax be abolished early in the coming session.

The Chamber of Commerce of Jackson, Mich., has also adopted a resolution calling on Congress to remove the telephone tax. The logical point is made that as the tax was eliminated from the transportation act in 1922, relieving the railroads, the same consideration should be shown the wire service.

Secretary of the Treasury Mellon specifically recommends the repeal of the telephone toll tax in an official statement issued November 12, in which he advises a cut in federal taxes of $323,000,000, but experience shows that department suggestions do not always convince Congress.

The more public sentiment is aroused, the more likely Congress will be to take favorable action.

* * * *

And while they are about it, telephone men would do their own business a valuable service by agitating the question of limiting the issuance of tax-exempt securities. There is probably no way of accurately estimating the damage done the utility industry by the flood of tax-free bonds issued by the various government bodies, but it is undoubtedly of great magnitude — and it is, moreover, mounting higher every day.

The National Industrial Conference Board of New York, in its recent report on taxation, states there are already outstanding 23 billion dollars in federal securities, and 10 billions of state and local government bonds that are tax free.

Capital invested in these kind of bonds pays no tax on the income therefrom. The result, of course, is that when public service corporations and general industry go into the market for money they must pay a rate sufficiently higher to cover the tax. Otherwise, investors are not interested.

The consequence is that capital to carry on business, construct new buildings, give employment and otherwise create and maintain prosperity, costs too much, and the burden of this unfair competition with tax-free offerings is holding back progress.

* * * *

An effort was made during the last Congress to prevent tax-free bonds from competing with industrial securities, but no immediate relief was forthcoming. The agitation was begun, however, and a good start made in educating the public to understand the danger of this situation, for it is now generally admitted that serious trouble is in store for American business if so much American capital is to continue to be hidden away in tax-free bonds while industry is compelled to pay a double bill.

The double bill, of course, comes in

when industry has to pay too high a rate for needed capital, and also to foot the taxes necessary to pay interest on the government, state, municipal, road, school and bonus tax-exempt bonds.

For that reason all utility interests should unite in urging Congress to take steps to stop or limit the flood of tax-free bonds and give business development a square deal.

* * * *

Following the lead of public service companies, most industrial leaders are paying more and more attention to the importance of business interests winning the confidence and good will of the public. For example, refer to an address made at Springfield, Ill., last week by Col. Robert W. Stewart, one of the Standard Oil leaders, in which he touched on points bearing directly on this question.

"American industry and American business," said he, "must so conduct their affairs as to prove themselves worthy of public confidence or else they cannot live."

He declared that once industry and business lose public confidence and support the enthusiasm of the American people will carry them along to the condemnation of the whole industrial structure. When the people, however, understand and get the proper appreciation of the vital relationship between industrial prosperity and general national prosperity the country will be secure.

As chairman of the board of directors of the Standard Oil Co., of Indiana, Colonel Stewart defended his concern against the popular accusation that it is a monopoly. He said that "the idea of monopoly is abhorrent to the minds of the American people and will not be tolerated by them," and then proceeded to argue that the Standard Oil subsidiary of which he is the head is not monopolistic, inasmuch as it has competitors who control more of the oil business than does his company.

This anxiety on the part of one of the spokesmen of big business to escape the taint of monopoly is important as showing a strong conviction that the public is as wide-awake to the evils of monopoly as ever.

It adds more corroborative evidence to the increasing belief that big business enterprises can become too big for their own ultimate good.

* * * *

The writer of a literary weekly review calls attention to the fact that three of the noteworthy stories printed in a national publication during the summer months were written by a New York telephone operator.

The critic manifested surprise at this discovery because, prior to these efforts, the telephone worker had never tried to write any fiction, and had no special literary training. The explanation of the operator's success was: "They (the stories) were merely examples of having something to tell—and they were sold."

Telephone operators' work brings them into touch with human experiences that are real, actual events, and that is why the new author had "something to tell." Truth is stranger than fiction, and personal experience is more likely to yield a better literary output than even the efforts of a strong, creative imagination.

Soldiers wrote the best stuff about the war. Why shouldn't telephone operators be able to spin good yarns about real life?

Fundamental Plans Mean Economy

Practical Application of Fundamental Plans to Immediate Operations—Methods and Illustrations of Making Such Plans for Single-Office Areas—High Lights of Multi-Office Study—Presented at Canadian Telephone Convention

By F. M. Simpson,

Engineer of Fundamental Plans and Distribution, Bell Telephone Co. of Canada, Montreal.

There is elementary reason and common sense in the basic idea behind fundamental plans. They never fail to commend themselves to anyone who will take the trouble to inquire what they mean. I have never met an individual, either in or out of the telephone business, to whom their underlying logic did not make an instant appeal.

That in so costly an enterprise as the construction of a telephone system which must be ready under all conditions to keep pace with the growth of the community, there should be careful planning, an accurate and scientific forecast of potential development, is surely an eminently reasonable thing. That the information assembled as a guide in making such a forecast should be as comprehensive and as accurate as possible, is wholly necessary and logical; there is too much involved to leave anything to chance.

Bankruptcy is too often the outcome of hasty or ill-considered planning, while the reward of well-conceived, carefully worked out fundamental plans is a succession of economies that grow and grow as the years pass.

What do we mean by the term "fundamental plans"? For the purpose of this talk I am including in it the development study, ultimate central office locations and central office areas, the program study, the loop and trunk study, conduit plan and the cable study.

The fundamental plan has sometimes been thought of by the construction forces as merely a general guide to the arrangement of central offices and outside plant. The sole aim has sometimes been that the plant should be found reasonably satisfactory at the end of 15 or 20 years, without much regard, perhaps, as to whether present plans followed along scientific lines or not. This principle sacrifices all present benefits from fundamental plans.

If there are any executives who interpret the fundamental plans in this way, they are not giving the engineer a chance to show substantial savings for the company by following, step by step, a carefully-studied program of the distribution system. Our practice of making program studies and cable distribution studies for short periods, assures the accomplishment of an ideal system.

The questions the fundamental plan engineer is called upon to answer are nearly always brought about by the necessity for some immediate action in an exchange. The necessity for such action may be occasioned by a building or a switchboard becoming inadequate, or by congestion in some of the important conduit runs.

When such questions arise, we must know the present development and what development we may expect to have in the district during the next few years. This involves the practical application of the fundamental plan to the immediate operations.

The use of the 1,200-pair cable, the installation of No. 24 gauge conductors, and the economical use of various grades of cable in the outside plant, are other ques-

tions that can be answered only when an accurate estimate of future growth is available.

I will try to describe and illustrate as fully as time will allow, our methods of making fundamental plans for a single-office area. Only the high spots of a multi-office study will be touched, as a detailed description of this would be very lengthy and tedious.

Fig. 1 shows the essential duties the fundamental plan performs in the telephone system. This diagram should be carefully noted. It clearly indicates that practically all departments are affected, either directly or indirectly.

Development Study.

The collection of field information is naturally the first step in the set-up of a development study. A telephone analysis and character study are made of the entire exchange area. These include a careful classification of all existing premises, based on character and rentals.

The character of each building is clearly indicated by symbols, together with the estimated changes in buildings and those forecasted for vacant property capable of development. This data for each block and all the surrounding territory is placed on a map and, after all existing buildings have been assigned the proper telephone factor, the result is known as the "Present Possible Number of Lines." Therefore, by "Present Possible Number of Lines," we mean the number that, with ample facilities and proper rates, could be obtained by a perfect canvass.

The existing classification of service and the location of each station is accurately recorded at the time we collect the field data, and this enables us to have an exact picture of the character of each residence or place of business and the present service which each is obtaining.

Estimates of development are not based upon existing telephone conditions or past growth, but the existing classification of service is collected so that we may determine the per cent development in stations for each class of premises at the date of the survey.

The data to be collected includes physical conditions such as: Streets not suitable for underground conduits, lanes suitable for distribution, obtainable rights-of-way through blocks, obstructions by shade trees, electrical hazards, stationary bridges and swinging bridges, etc. Notes are made of the condition of the pole and table leads, and information is obtained from local authorities regarding available power which may be required by the company.

Fig. 2 shows a population curve. The figures are obtained for the entire area under study, for the past and present, and wherever possible, for suburban, zone and ward areas, and considering all conditions, a curve is projected for a period of 15 to 20 years.

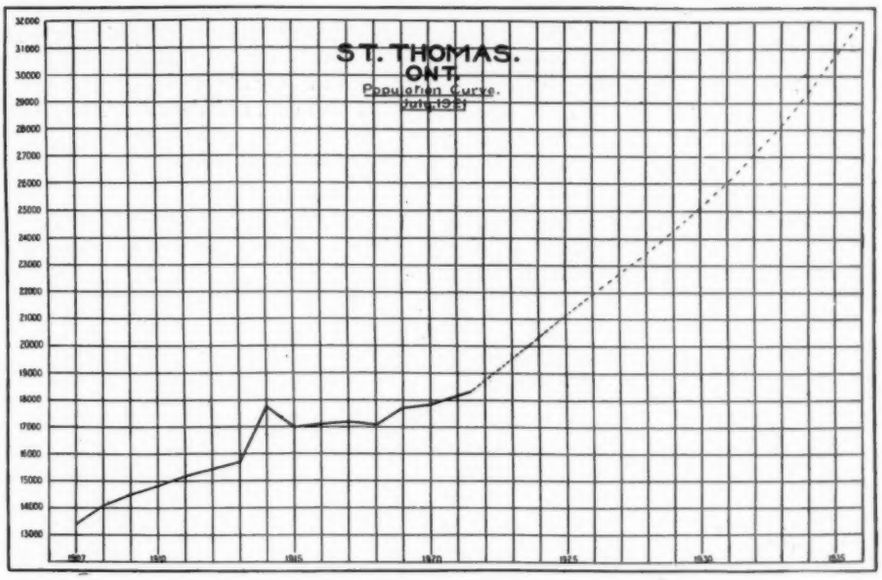


Fig. 2. Population Curve with Projection for 15 Years.

From the ratio of each class of premises and present population to the ultimate population, we determine the ultimate number of premises. Each classification of dwelling or business premises will bear a different ratio to the population and, therefore, each class is treated separately and the growth is figured from the curve of the estimated population.

The development study must show the present telephone requirements, the 15-20 year estimated requirements and intermediate periods, for the purpose of preparing program studies and the design of the cable distribution system.

Field surveys are made approximately every five years, and in computing our estimated premises for intermediate and ultimate periods, in cases where we have two or more previous surveys, we draw curves indicating the past growth of each class of premises.

Fig. 3 shows how a check is obtained of the ultimate number of premises arrived at by the field survey in combination with the population estimate as previously stated. by projecting the foregoing curves.

Fig. 4 is a reproduction of the form giving the summary of the development information handed to the general commercial engineer for the purpose of making the necessary rate studies.

Fig. 5 illustrates the accuracy obtained in the estimating of subscribers' lines for all studies having passed the first 5-7 year period. At the top of each line will be found the name of the central office area and the percentage of actual to estimated growth. The average degree of accuracy obtained is 94 per cent.

Fig. 6 illustrates the poor principle of projecting a subscribers' line curve forward, based on past growth, to obtain an estimate for even a short period in the future. The line of dashes indicates the fundamental plan estimate made in January, 1909, the solid line the actual develop-

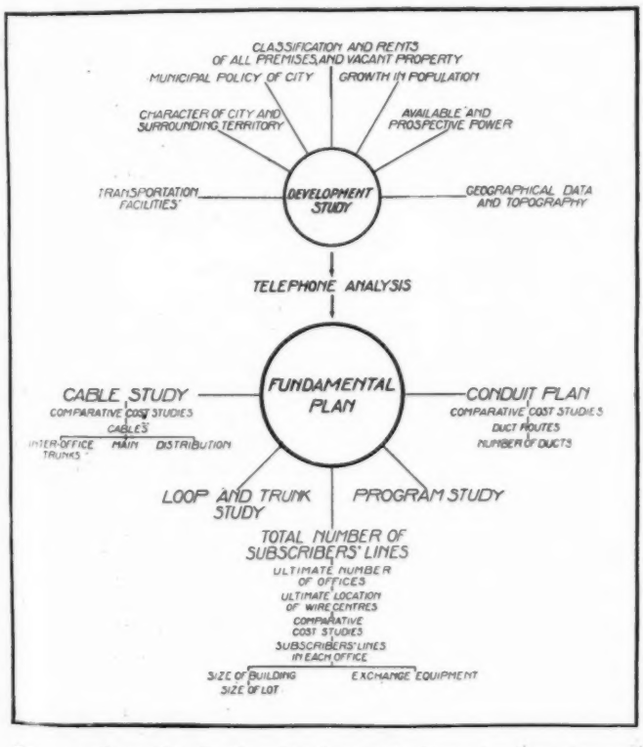


Fig. 1. Essential Duties Fundamental Plan Performs in the Telephone System.

ment, and the dotted lines represent projections made as described below.

The growth which Sherbrooke Exchange has experienced in the past 14 years is intensely interesting, as will be seen, illustrating the possibility of making errors on both the high and low side, for the same exchange area.

In 1909, Sherbrooke had 690 working subscribers' lines; in 1912, 805 lines. If this three-year rate of growth had been carried forward for five years, the growth would have reached 1,000 lines in 1917, but as the actual lines reached 1,200, the shortage of cable pairs would have been serious.

If the rate of growth had been taken between 1912 and 1915 and carried forward for five years from the end of 1914, the estimate would have indicated 1,800 lines by January, 1920, whereas the actual lines did not exceed 1,460. I could mention 15 or 20 similar cases where estimates on past growth would have resulted in serious errors.

When the final distribution figures of the 5-7 and 15-20 year estimated subscribers' lines have been determined and indicated block by block on the preliminary record map of possibilities, they are transferred to the working plan on which is indicated all existing cable construction and pole routes.

I will now pass on to the question of the ultimate central office location or wire center, and why it is a matter of so much importance that the office should be located at the center of distribution, or as close to it as possible, for it is evident that there must be some point within every exchange area from which the cost of wire to reach all subscribers will be a minimum.

Our working plan now shows the number of subscribers' lines estimated for the entire exchange. In the case of a single-office area, to determine the wire center (in a gridiron city for example) we divide the total number of lines into half from the north to the south and again from the west to the east, and the point where these two lines bisect each other is the theoretical wire center.

If this center is at a considerable distance from the location which would be desiderable from existing plant, commercial or real estate standpoints, a study is made of the construction costs and annual charges which would result from a move to the wire center and the desirability of moving determined.

For public convenience, it is desirable that "Central" be located on or near the main street in small cities, and this point always receives consideration in our studies.

Fig. 7 is a composite diagram giving an example of office location comparisons. It illustrates the elimination of No. 19 gauge cable if the office is correctly located and the use of No. 24 gauge in conjunction with No. 22 gauge cable. The wire center is shown by a circle and the rectangular figure indicates an office located four blocks west and four blocks south of this point.

A 500-ohm subscriber's loop has been assumed for this example.

In the case of multi-office cities, the first step is to lay out the maximum number of central offices which it seems reasonable to assume the exchange area may require. The most economical wire centers are then determined for various central office districts estimated to be required at the ultimate date, on the basis of the annual costs of plant and operation.

FUNDAMENTAL STUDY OF ST. THOMAS

PRESENT AND EXPECTED INCREASE IN POSSIBILITIES FOR 5 - 7 AND 15 - 20 YEAR PERIODS, ETC.

SHEET No. 1 DATE July 1921. FILE No. 9021

PRESENT POPULATION	: 17850														
YEAR	: 22000												MULTIPLIERS		
YEAR	: 33000												YEAR		
													YEAR		
CLASSIFICATION		PRESENT NUMBER OF PREMISES	PRESENT RENT PER MONTH	PRESENT TELEPHONE STATIONS								ESTIMATED NUMBER OF PREMISES			
				TOTAL	IND.	2 PARTY	4 PARTY	8 PARTY	EXTRA GUYS	RURAL PARTY		5 yr.	15-20 yr.		
SUPERIOR RESIDENCE	E	4	non-rentable	8	4	4						5	7		
FIRST CLASS	X	68	$50 - $60	96	89	7			30			84	186		
FIRST CLASS	A	678	$40 - $49	870	448	119			3			822	1515		
SECOND CLASS	B	1056	$30 - $39	618	389	230						1280	1810		
THIRD CLASS	C	2004	$20 - $29	887	280	277						2462	3700		
FOURTH CLASS	D	901	$15 - $19	17	6	11						980	848		
APARTMENTS	H	—													
Public Telephone Stations				28											
FIRST CLASS BUSINESS	X	708		701	580	77			24			878	1613		
SECOND CLASS	Y	41		80	18	7			10			61	92		
HOTELS (NUMBER OF ROOMS)	F														
P B X (SYSTEMS)		8		80								8	10		
RURAL LINE STATIONS ●		* For this information see map and rural line form.													

Fig. 4. Form Used for Summary of Development Study.

In making these ultimate comparison studies, each central office is shown at its most economical location from an outside plant point of view—that is, it is shown at the point where, taking into account both subscribers' and trunk cables and conduit, the outside plant costs will be the minimum.

The relative annual costs of the following items are developed in these ultimate comparisons:

1. Subscribers' lines.
2. Interoffice trunk lines.
3. Central office equipment.
4. Operating.
5. Central office maintenance.
6. Buildings.
7. Land.

The amounts of plant and labor for each arrangement of central office districts and the annual cost based on those items are developed for each plan set up for consideration. The resulting summary of annual costs gives an instantaneous picture of the relative economies of the different arrangements. It forms a basis for determining how many central offices will be desirable in the exchange and will serve to eliminate such plans as are too expensive, either in ultimate annual costs or on account of extensive outside plant rearrangements, to deserve further consideration.

As suggested, the plans laid out for the ultimate comparison are of a more or less theoretical nature, some having little regard for existing plant conditions, while

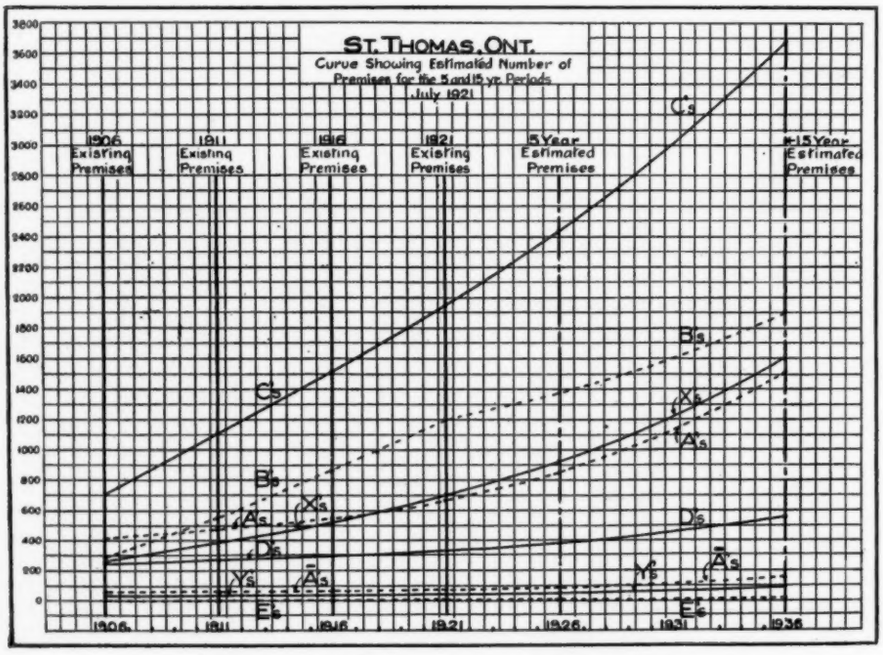


Fig. 3. Method of Checking Ultimate Number of Premises.

others are set up to approximate the present arrangement of districts and which, if adopted, will require little change from a natural program of extending the existing plant. This is done in order that we may have a measure of the economies of the present arrangement to compare with the more theoretical arrangements.

Program Study.

The ultimate comparison, therefore, indicates the relative economies of several different ultimate arrangements, and with the results of this comparison as a basis, the engineer is able to select several of the more favorable plans for further consideration.

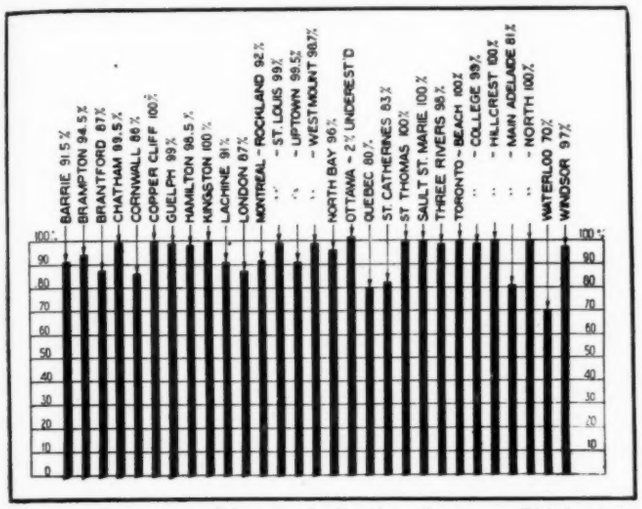


Fig. 5. Percentage Diagram Indicating Accuracy Obtained in Estimating Subscribers' Lines for All Studies Having Passed the First 5-7 Year Period.

This further consideration, which is spoken of as the program study, is really the practical application of the fundamental plan. Its purpose is to develop the relative economies of various programs by which the present plant may be extended to correspond with one of the more favorable ultimate arrangements.

A program study may be made to determine the desirability of opening a new branch office or of locating a replacing office adjacent to the existing building as against a move to the wire center or to a location where land can be purchased more cheaply. Other conditions calling for program studies might be cited, but these serve to illustrate the idea.

In setting up any program of plant extension to develop the plant so that it will meet the requirements of one of the suggested arrangements of ultimate central office districts, the first item to be considered is the growth in the various parts of the district under consideration.

We are able to determine with considerable accuracy the limitations of our existing plant—that is, how many lines a switchboard will hold before it becomes congested, how much farther a present switchboard can be extended in an existing building and what building extensions are possible and reasonable at a given location.

Knowing these limitations and having carefully prepared fundamental plan and traffic estimates of the telephone growth as to lines and stations and as to traffic, we are able to determine the various dates at which action must be taken to handle the service. We must also fix upon the amounts of additional plant required for subscribers' lines, interoffice trunk lines, central office equipment and buildings that will be necessary to care for the service for the proper periods.

What we do in setting up programs is just this: Let us assume that an existing building requires relief and we wish to determine if it is more economical to erect a new wire center building or continue to serve the district in question from the existing building after an addition has been made.

First, we must determine when relief equipment beyond the capacity of the present buildings must be ready for service. At that date we must have:

(A) The new building with the necessary equipment to provide relief for the district for a reasonable period; or

(B) The building addition with a similar amount of relief equipment.

In A we may decide to install machine-switching equipment, while in B we may wish to consider also the desirability of caring for growth by extending the manual equipment. Similarly, in A there will be considerable outside plant rearrangements and provision must be made for new groups of interoffice trunks to a new central office, besides additions for growth, while in B we have only to make the necessary outside plant additions to care for growth.

We must next determine how long the different items of plant planned for the initial period will last and the necessary plant additions under each program to carry on the service in a proper manner.

In each case the plant must be so planned that it will care for the various classes of service properly. This necessitates a careful consideration of the classes of service in the two offices under plan A, the necessary interoffice trunks to complete the traffic, proper operating and maintenance forces to care for two operating centers under plan A and one operating center under plan B.

The study is carried on over a period sufficiently long to afford a reliable measure of the relative economies of the two cases on a present worth basis. That is, the charges against plant and operation are determined for each year and the present worths of these charges summarized for the period of the study.

The program study must also include in its proper place such items as losses on plant removed, charges on money used to finance new operations up to the time such plant will begin to earn and any items of miscellaneous expense involved in carrying through the program. In this way the program study when complete gives a good measure of the relative economies of the different programs outlined, in annual

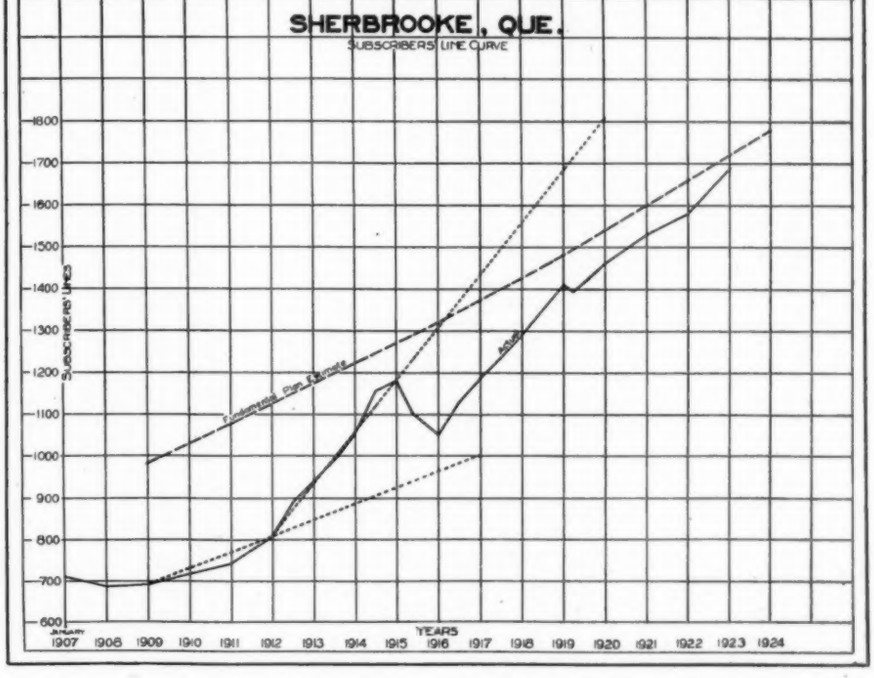


Fig. 6. Contrasts of Estimated and Actual Subscribers' Development.

costs over a considerable period, and also the amounts of capital required to finance each program.

The program study is becoming more important, now that we are embarking on extensive programs of installing machine-switching equipment and No. 24 gauge cable. It provides a means of determining the relative economies of placing machine-switching equipment at different points and also where manual equipment can be extended and continued in service with minimum losses.

A great many practical considerations must be taken into account in deciding which of a set of programs to adopt in a given case. For example, as we know, financial or supply conditions may make it impossible to adopt the most economical program and we are obliged to continue on a somewhat uneconomical basis, simply because it is not feasible to get the equipment or erect the buildings needed to go ahead in accordance with a program which we might otherwise adopt.

The practical application of the fundamental plan provides a fund of information which is of great value in determining the proper methods of procedure to be adopted to meet the needs of the system. This work calls for the closest coöperation between the commercial, traffic and plant departments.

In order to develop satisfactory and workable programs, it is necessary that all the estimates which go into them be developed with a full appreciation of the importance which attaches to the work. Every step in any program outlined is based primarily on the increase in telephone development which, together with the estimates of traffic, form the principal basis of the engineers' estimates of costs.

Loop and Trunk Study.

Another subject forming an important part of the fundamental plan is the loop and trunk study. This study consists of a comparison of costs of exchange plant with varying assumptions as to the relative transmission losses in subscribers' loops and in trunks. There are three primary estimates to be taken into account in a loop and trunk study:

(1) The transmission basis—that is, the standards of transmission under which the plant is to be designed to give the subscribers satisfactory transmission service.

(2) The number and location of the subscribers' lines in the district, as determined by the development study.

(3) The number and terminal points of trunk lines within the exchange. This item is based on the estimates of traffic which may be expected with the system of subscribers' lines indicated in the fundamental plan.

With these fundamental data developed, the plant is designed to give the required service, both as to transmission and as to traffic, under various assumptions of relative transmission losses in the trunks and in the loops. The sizes, amounts and grades of cable required under these various schemes are developed and the cost equilibrium resulting in a minimum total annual cost of outside plant determined.

The results of the loop and trunk study, then, indicate the limits to which No. 24 and No. 22 gauge cable can be used economically in the subscribers' lines and the resulting gauges of cables required in the various groups of interoffice trunks. This gives us a definite program to follow in extending the outside plant in the most economical way and one which will result in minimum costs of providing the necessary outside plant facilities to give the proper transmission service.

The results of many studies indicate that in the aggregate in single-office exchanges, using the present standard substation instruments where required, 90 per cent of the loops could now be in No. 24 gauge cable; in small multi-office exchanges 80 to 90 per cent; in the large multi-office exchanges 70 to 80 per cent, and in a few of the very largest exchanges from about 60 per cent upwards.

This means that for the system as a whole probably upwards of 80 per cent of the subscribers' lines and approximately 65 or 70 per cent of the total conductor feet in cable could be No. 24 gauge. In addition to this, a considerable amount of No. 24 gauge could properly be used in combination with No. 22 gauge. No. 24 gauge cable can also be used in some of the trunk groups in practically every multi-office exchange.

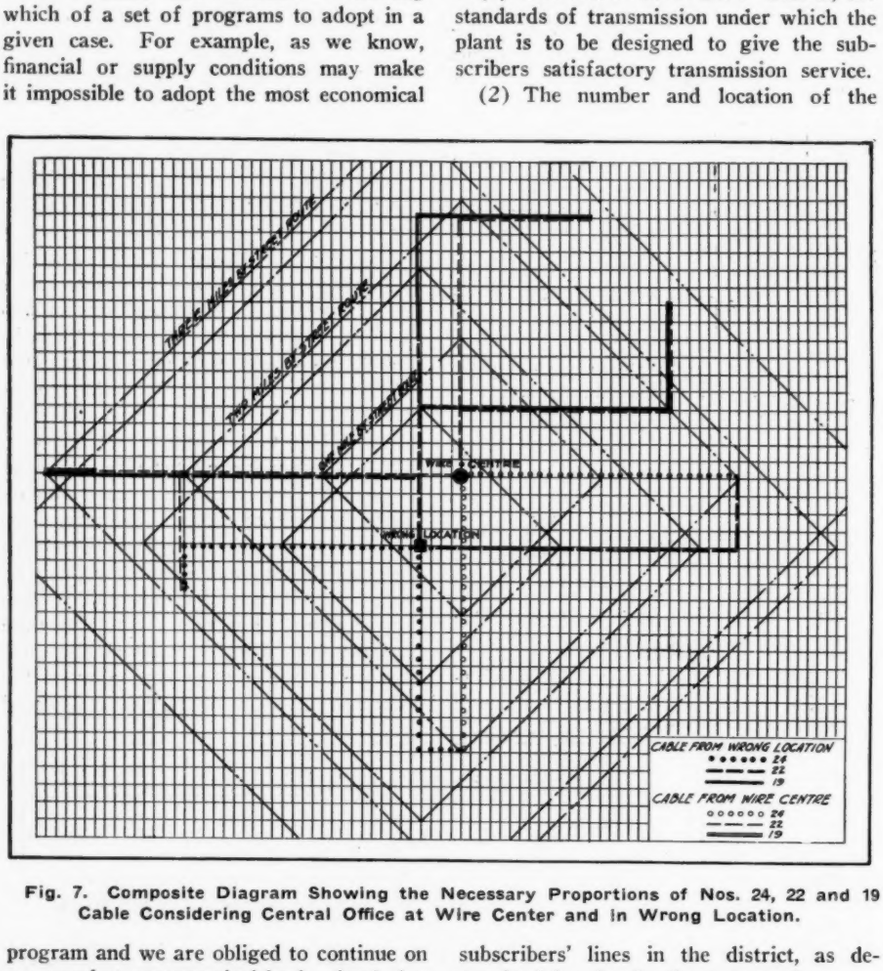


Fig. 7. Composite Diagram Showing the Necessary Proportions of Nos. 24, 22 and 19 Cable Considering Central Office at Wire Center and in Wrong Location.

Conduit Plan.

Having decided upon the office location and number of districts and their boundaries, the next step is a preparation of the fundamental conduit plan. This plan indicates the routes which should be followed in conduit construction and the number of ducts along each route.

The general principle involved in making fundamental conduit plans in large cities is that each block, where there is dense distribution of subscribers, should be touched at some point by the underground, and that a given run of conduit should reach as many blocks as possible. This result is evidently best obtained by running the ducts along the narrow end of the block and, as alleys generally have their entrances at that end, we have the double advantage of an easy and convenient distribution from the underground terminal pole.

The ideal arrangement is to construct the laterals on alternate streets from the base line or main conduit route passing the office; this layout is made so that each block, as far as possible, will be touched once only, thus avoiding useless expenditure.

Should the number of existing ducts be insufficient to carry the estimated load, even with the use of large size cables, a study is made of the relative cost of constructing a parallel lead or increasing the number of existing ducts.

The required number of ducts is based on the use of 300-pair No. 19 gauge, 400, 600, 900-pair No. 22 gauge and 1200-pair

(*Please turn to page 23.*)

Gave Service While Board Traveled

Eight-Position Magneto Switchboard Moved From Second Floor to Ground Floor of Building Without Interruption of Service—Details of How Move Was Accomplished as Part of Consolidation of Two Systems in Joplin, Mo.

By R. L. Cline,
Traffic Superintendent, Home Telephone Co., Joplin, Mo.

In response to popular demand, a consolidation of the Bell and Home telephone systems was arranged at Carthage, Mo., the Home Telephone Co. to operate the system after the consolidation. The citizens requested a demonstration of automatic equipment, and after seeing it they declared themselves in favor of it; so the installation of Strowger automatic is now in process.

It was necessary to build an addition at the rear of the building now occupied by the Home company and also to add another story and completely change the interior of the building. The general offices were moved a block north and the room formerly used for this purpose was dropped to the ground floor level. An eight-position local magneto board served the subscribers of this exchange and it was necessary to move this board from the second to the ground floor and into the room formerly occupied by the commercial department.

The switchboard was raised and placed on a sled-like arrangement built of 6-inch by 8-inch timbers so that rollers could be placed under it and the whole thing moved along at once. All sections were also bolted together and held securely by planks extending full length of the switchboard, front and rear. They were drawn tightly together at each end, and at intervals between, by long bolts. The same thing was done along the entire top and bottom of the switchboard.

A skid was built, extending from the end of the switchboard to the door of the room in which it was proposed to place it. Blocks and tackle were used at each end of the board, one set for pulling it along

Itinerary of the Switchboard Included Passage Through Door in Brick Wall.

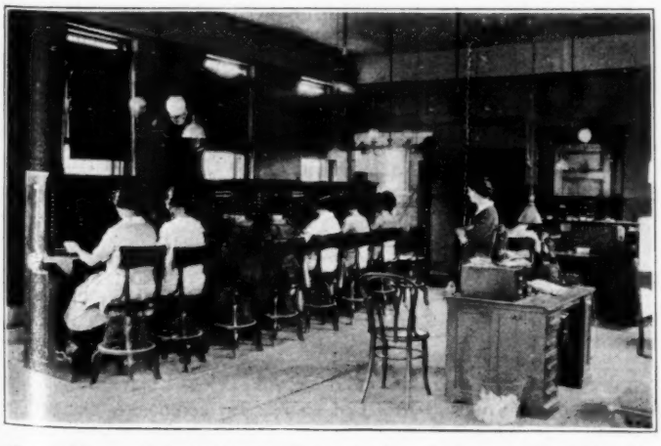
and the other set for holding it after it had started down the skid. An overhead set of blocks was also rigged up to keep the front end level and to prevent buckling after the center had passed the supper end of the skid.

All cables and power wires were spliced out and made long enough to reach the new location. The cables were then wrapped and tied to the back of the board so they could not be pulled apart at the splices. One of the illustrations shows the cables before this work was finished.

The move was made late at night so service would not be interrupted, sufficient margin of time being allowed, however, to clear any trouble that might develop. It required approximately 30 minutes to move the board from the old to the new location. The night operators continued to work, walking along and answering calls until the board was too far down the skid to follow, then going around and beginning work at the front end as it came through the door.

After reaching its new location, the board was turned and set at right angles to the position formerly occupied. Very little trouble developed and what did show up was quickly cleared.

In view of the fact that this board had been in service for about 20 years, and considering the small amount of trouble and the short time consumed, it was felt that this work was very successfully done.



Front View of Switchboard Prior to Its Trip to Floor Below in Exchange of Home Telephone Co., Joplin, Mo.

Eleven Years Waiting for a Number in the Azores.

As a result of an agitation which began in 1912, Consul W. A. Childs at San Miguel, Azores, reports to the U. S. Department of Commerce that the picturesque little port is soon to have a telephone system; 300 telephones with the necessary wire and other electrical equipment have already arrived and more have been ordered.

Top of Skid Showing Switchboard in Readiness to Start Traveling.

The telephones were purchased from Sweden through government officials in Lisbon. Approximately 1,000 telephone poles of pine have been ordered from the Island of Pico of this group, and 300 chestnut from Portugal.

U. S. Association on Depreciation

Extracts from Brief on Depreciation Accounting Filed with Interstate Commerce Commission by United States Independent Telephone Association—Prepared by C. B. Randall, St. Paul, and H. L. Beyer, Grinnell, Ia.—Conclusion

Rule 6 requires that depreciation charges be computed separately for each class of property at the percentage rates to be determined, and shall be distributed under the straight-line method to operating expenses during the estimated service life of the property *or as much thereof as may be consumed at retirement, if such retirement takes place prior to the expiration of the estimated service life.*

Acccunting by Classes of Property.

Two objections are made to this rule. First, that accounting by classes as to annual charges for depreciation and debits against the resulting reserve is almost impossible of accomplishment, and, if done, involves a prohibitory expense.

The percentage applicable to each class of property ordinarily are, and should be, ascertained as each to class of property. But, having these percentages per class, it has never been the practice to make separate computations and separate charges per class each month to operating expenses, nor to subdivide the resulting reserve account into as many accounts as classes of property.

On the other hand, it has been the practice to obtain the same result by using a composite percentage applied to the property as a whole, which, when multiplied, produces the same total sum as if each class were multiplied by its appropriate percentage and the results added to a total sum.

In this composite figure, garage and stable equipment, shop equipment, tools and implements are not included, but are separately figured because of the short life of the property affected, and the resulting high rate of depreciation percentages. Handling just these accounts separately demonstrates the cost involved if all were handled separately.

By so using a composite percentage, but one entry is made against operating expense each month, and one credit to depreciation reserve. Upon retirement of property, credits are made to the appropriate plant accounts, and but one total charge debited to depreciation reserve.

This composite percentage so applied is changed year by year as the various plant accounts vary in percentage to the total plant account. In this way the amount charged to operating expense is exactly the same as though Rule 6 be followed, and the work and cost of accounting is reduced to a minimum.

So far as charges to operating expenses are concerned, no difference results, if this simpler method be followed. No other argument can be advanced for following Rule 6, except that, by composite computations, it be claimed to be impossible thereafter to verify the correctness of the percentage per class by the size of the unused reserve as to any class.

In the first place, proof of excessiveness, adequacy, or inadequacy of a reserve balance at any time can be ascertained only by studying past history, present conditions, and expectancies. This is done only by reference to capital additions and retirements, not to analysis of depreciation reserve account. From the study it is possible to determine approximately the amount then necessary in the reserve. Having this amount per class, the sum thereof can be compared with the book balance in the reserve account.

If the result of the comparison illustrates correctness as a whole, no further steps are necessary, since it has been proven the charge to operating expense is reasonable from the public viewpoint, and the resultant sum adequately protects the investor, which ends the government's interest in the matter. Reasonable accuracy is all that is required. San Joaquin & K. River Canal & Irrigation Co. vs. Stanislaus County, 191 Fed. 875.

If the result of the comparison be unfavorable, immediately a new basic study should be made, such as was made when percentages were first established—new studies of service life, etc.

Thus all can be accomplished by composite accounting that can be had by class accounting.

On the other hand, class accounting has several disadvantages not found in composite accounting.

Under the recommendations of the depreciation section, 27 classes of property are recognized. Under the claim of the telephone companies, there may be as many as 38 accounts.

To compute separately the charge for each account to operating expenses each month—credit the 27 to 38 separate results to 27 or 38 separate depreciation sub-accounts—and each month debit to such several sub-accounts the charges on account of plant retirements as to each—involves an expense of accounting which seems unnecessary, is very costly and burdensome to the largest companies, and will prove prohibitive to the average companies.

Class C companies are recommended to follow this accounting system even though rates be not now fixed. These companies have not the experience, records, or accounting forces to permit of any such course.

The percentage included to cover hazards has sometimes been ascertained by setting up over a sufficiently representative period of time the company's total loss by hazards, and thus ascertaining the percentage as compared to the total average plant in service during that period, the result was then added to the composite of the other studies.

No attention was paid to hazard loss by classes, nor do the accounts show the same as such in the case of many companies. To attempt now to compute this by classes seems not only extremely intricate but unnecessary. Yet such a course must be pursued if class accounting is to be done.

Regulation of utilities has met with varying degrees of approval by the public. It has accomplished wonderful results in many respects. Along with this regulation has grown up jurisdiction over utilities by various boards and governmental agencies having powers over rates, service practices, securities, taxes, wages, accident compensation, etc. Each has its requirements as to records and reports. The requirements of any one probably do not amount to much, but the sum total of all has been to impose very heavy expense burdens on the utilities.

All these expenses are reflected in the rate charges to the public. It is, therefore, incumbent upon both utility and regulating authority to hold such expense to the absolute minimum consistent with proper operation and regulation. With this idea in mind we strongly urge the advisability, aside from the other sufficient reasons, for permitting composite accounting rather than by classes.

Factor Favoring Composite Accounting.

Another factor may be urged in favor of composite accounting. All bases for depreciation are based upon a computation of service life. Such computations are based on the historical record of the plant, additions and retirements, age at retirement, etc., modified by the opinion of the management as to known or immediate expectancies in the future, acting to shorten or lengthen life, as shown by the history of the past.

Such studies, like all mortality tables, must have in them a factor of safety to cover the unexpected and unforeseen. Experience of the company governs. Cumberland Telep. & Teleg. Co. vs. Louisville, 187 Fed. 637. In composite accounting this factor becomes almost negligible because any such occurrence is generally confined to but a few classes of property.

As a result, where one account may overrun, another will underrun, and the whole will balance out. If class accounting be required, no such balancing as between classes can occur; hence a decided factor of safety would be demanded by business judgment as to each class, resulting probably in a larger gross charge.

The possibility of any of these accounts appearing in red, as may well occur in class accounting and which will not occur in composite accounting, and the effect of such red balances on investors, should be considered. The telephone business requires each year new capital to expand and grow with.

Service depends on this power to get capital. The investor immediately looks to the reserve to see what assurance he has as to protection from diminution of investment. If he does not find a satisfactory showing, he will not invest on a promise that the condition will be remedied in the future. He judges the future by the past. Telephone utilities stand so favorably in the investment markets today that nothing should be done which may endanger that position.

Rule 6 states that only so much of cost may be charged to operating expense through depreciation as may be consumed at retirement if such retirement takes place prior to the expiration of the estimated service life. Under the methods used for ascertainment of average service life, no such condition may occur. The life of each item of property in each class is considered—that which is retired in one year, and that which goes 20 years or longer.

These actual life periods are then averaged into average life, which is longer than the shortest actual life and shorter than the longest actual experience. Hence no retirements occur which may not all be included in depreciation charges. The only thing which can occur is that which unforeseen may affect so large a proportion of a given class as to destroy the correctness of the average life used. If this occurs under composite accounting, it is balanced by occurrences in other classes of property, and no appreciable effect is disclosed by the reserve.

Formulae for Ascertaining Percentages

The depreciation section has suggested certain formulae or means for ascertaining the percentages to be applied in each year. It has been shown that these formulae are impracticable, and hence we do not now further discuss the same. One illustration might be added, viz.—applying the formula to a building.

Nothing is accrued until the year the building is retired, thus throwing its entire cost into one year with possible disastrous results as to net earnings and with no way of spreading that cost to the users throughout its life. The telephone companies do claim, however, that the methods now used, to wit: Cost 100 per cent, less net salvage x per cent, equals y per cent, divided by life in years equals per cent cost to be charged annually.

To illustrate: Building cost 100 per cent; salvage less removal 40 per cent; life in years 30, or 100 per cent—40 per cent equals 60 per cent. Sixty per cent divided by 30 equals 2 per cent annual charge.

The rate per class being thus established, the whole are consolidated with mathematical precision into a composite percentage which, when applied to the property as a whole, produces the same result as though each class were multiplied by their appropriate percentage separately, and the separate answers added to a total.

The property account to which the percentage is applied changes from month to month in the large companies where property in large amounts is retired and added from month to month; but, in the small companies, approximate exactness will result if changes are considered but once a year.

Applying this method spreads the cost as property is used up.

The commission in its order No. 14700 requested discussion of four questions. Taking them in the order stated the first question is:

QUESTION 1: Has a depreciation reserve any other purpose than to provide a means of equalizing the effect of property retirements, so that the disproportionate burden may not fall upon the operations of any one year? If so, what other purpose or purposes has it?

The telephone business differs from private business—mercantile or other—in that it is subject to regulation. In order to be effective such regulation requires books and records different from private business.

Private business writes down in capital accounts each year if depreciation has occurred. Telephone companies cannot do so without destroying their record of cost in place, which is demanded by all regulating authorities.

Depreciation of telephone capital assets does occur year by year even though not in a straight line. Though thus accruing, it is not realized by retirement until a later date. Hence, aside from accounting, necessities cannot be taken care of by writing down of assets year by year as charges to meet same are imposed, since it is not realized except by retirement. Since assets may not be written down, the accounting for these charges must be taken care of in another way.

Using a double-entry bookkeeping system, a debit to operating expenses must be balanced somewhere by a credit; hence, in the liability side of the balance sheet appears these credits under the title "Reserve for Accrued Depreciation." Ordinary business would immediately wipe this out by debit and a credit to capital assets column since their depreciation is generally realized as it accrues. In the telephone business this last entry is deferred until actual retirement of capital assets.

Much of the confusion on this subject is due to a misapprehension of what the account "Reserve for Accrued Depreciation" really is. Too often regulatory authorities treat the account as they would a reserve account in a bank statement, where assets are presumed to represent dollar for dollar as stated, and reserves are treated as something additional thereto; whereas, in the telephone statement, as has been stated, the asset column of the balance sheet does not reflect true assets, since some depreciation accrued but not realized has taken place, and hence has not been recognized by a writing down of assets.

Hence it appears that a reserve account is necessary to offset accrued and anticipated diminution of assets now shown by the books, and its form is made necessary by the requirements of accounting systems incidental to the telephone business. It is strictly a suspense account, a place where credits may be temporarily carried until debits occur on account of retirement of investment from service.

The reserve account itself cannot dictate the manner of its accumulation, nor how it is obtained through charges to operating expenses.

The manner of accrual of the reserve account is purely secondary to the necessity for the charges to meet diminution of investment. In considering the manner of accrual other questions enter.

Practically all telephone plant is placed to meet the present or future requirements of immediate subscribers. But a small percentage is placed for expected subscribers. There is a continuing change in demands of existing subscribers because of outside moves, inside moves, and the demands of so many short-lived subscribers (the average life of a subscriber in one place being between two and three years), such that the depreciation charge must be evenly spread over the life of the property elements if each subscriber is to pay his equitable share.

It is undisputed, of course, that depreciation of telephone property does not occur in a straight line from time of placing to time of retirement. Rot and rust start slowly like the decline of the human body, and then, as the structure is weakened in strength and fibre, increase in rapidly increased amount during the latter years of life. Inadequacy, obsolescence, hazards—all are irregular in action, but, when property is placed for service to meet the immediate subscriber, it is his demand that subjects the investment to these effects; hence he should pay his share.

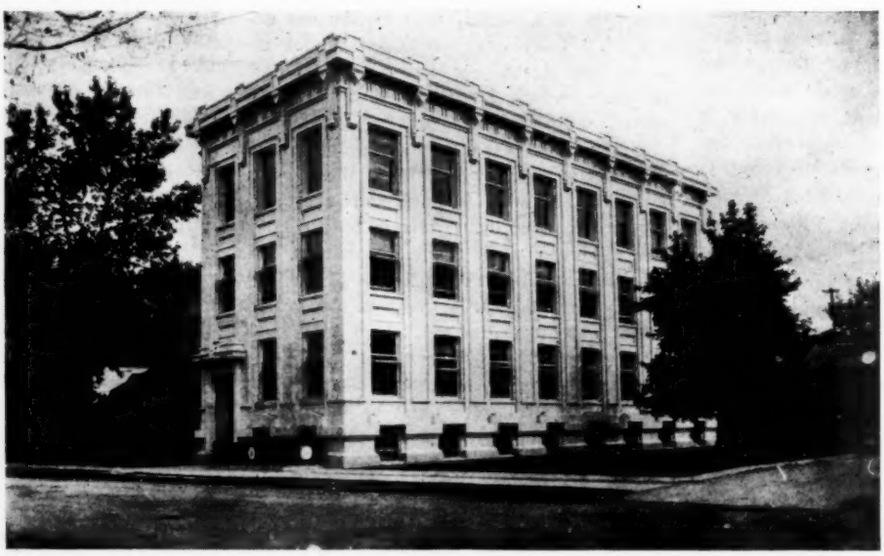
The subscriber who happens to be the user at time of retirement, or at the time greatest depreciation takes place, each has his liability. This liability can only be

Strowger Automatic Equipment at Wausau, Wisconsin

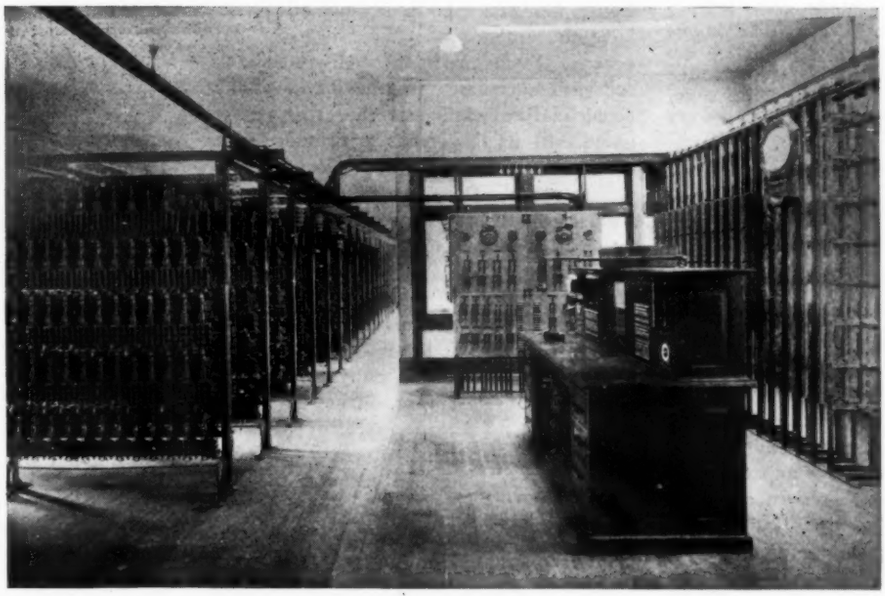
Eighteen years ago the Wausau Telephone Company, Wausau, Wis., installed a Strowger Automatic switchboard serving 800 stations at Wausau, Wisconsin. Today this same exchange serves more than 4000 subscribers, and the equipment used includes, besides the original installation, numerous additions of various later types, all of them interconnected and working together as a complete unit and rendering a grade of service that is well-nigh perfect.

In order to give all of their subscribers the benefits of the most up-to-date service made possible by the development of Strowger Automatic during the years since the original equipment was installed, the Wausau Telephone Company has just placed orders for new Strowger Automatic equipment to replace some of the earlier installed sections. This work will be accomplished in a number of steps thus gradually eliminating all but the more recent additions.

The Wausau Telephone Company's experience with Strowger Automatic equipment has been most favorable, as the remarkable growth and continued prosperity evidences, and this latest step in their development brings out one of the important features of economy in operating this type of equipment,—that a full life time of service may be had from every unit and every switch regardless of expansion or subsequent changes in design.



This splendid building has been the home of the Wausau Telephone Company since 1911.



This shows the Wausau switchroom as it appeared in 1911. The space to the right is now occupied by additions of "two-wire" Strowger equipment, and the older units on the left will be removed to make room for new equipment now on order.

Some Facts About the Wausau Exchange

Has grown from 800 stations in 1907 to over 4000 stations in 1923.

Is one of the most successful telephone properties in the country.

Has always rendered a highly satisfactory grade of service to its patrons.

Has been equipped for Strowger Automatic operation for eighteen years.

Automatic Electric Company

FACTORY AND GENERAL OFFICES: CHICAGO, ILLINOIS

BRANCH OFFICES IN ALL PRINCIPAL CITIES

ASSOCIATED COMPANIES

INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York

International Automatic Telephone Company, Ltd., London — **Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston, Paris**

Automatic Telephone Mfg. Co., Ltd., Liverpool — **Automatic Telephones, Australasia, Ltd., Sydney**

collected from all, if each pays according to the time he uses it; hence the inclusion of a charge in the bill each month, prorated on life, requires the payment from each of its equitable share.

Accounting practices incidentally favor this method that peaks in operating statements may not appear from this cause, thus destroying comparative value.

QUESTION 2: If a depreciation reserve has no other purpose than that above stated, will the method of determining depreciation charges which is recommended by the depreciation section provide a reserve which is no larger than is necessary for such purposes?

As has been seen, the object of a depreciation charge as now made is not primarily for the purpose of spreading charges evenly, but is primarily for the purpose of offsetting accruing and expected depreciation of property in public service. It has also been shown in answer to question 1 that it is necessary to make charges for depreciation as to spread evenly the cost over service life.

As heretofore stated the formula set up by the depreciation section is impracticable. The method stated in the report, corrected by the different treatment of salvage and removal charges, and, with service life and percentages ascertained as ordinarily now found in the telephone business, will produce a proper answer.

If it be accepted as a primary factor —accounting and economic—that charges shall be evenly spread year by year, then retirements for given years must be disregarded. Under present methods in practice, definite percentages are obtained applicable over several years, such that charges remain constant in percentage year after year, the resultant dollars varying only as investment increases or decreases. Only thus may charges be evenly spread, and the public be assured of equitable costs of service.

Under the methods outlined by the companies, the correctness of the charge and the resultant surplus is dependent upon accuracy of the average service life used. This is a question of fact and not of method; hence is subject of proof, and is not an objection to the method.

QUESTION 3: Should amounts reserved as the result of depreciation charges from what would otherwise be surplus earnings be segregated in a special fund, to be invested in whole or in part in liquid assets, so that companies may be in a position to make necessary or desirable replacements of property even when not in a position to market new securities on advantageous terms?

The amendment to paragraph 5 of section 20 has reference only to the charges which may be made, and not as to the subsequent disposal of the results of those charges. The commission's authority is limited to fixing the amount to be charged.

The course suggested by the question seems unnecessary without regard to legal questions as to power or ownership. Telephone companies are subject to regulation as to service. Service can be given only by a plant in efficient condition.

If a telephone utility fails in the performance of its obligation to give service by permitting its plant to fall from an efficient condition, the regulatory authorities, whether they be state commissions, municipal councils, or otherwise, have the authority to order it to be improved. Such an order is enforceable in the different states in various ways by penalties for violation of the order, or by mandamus in the courts with subsequent contempt proceedings if not there obeyed. Other remedies, no doubt, may suggest themselves. State ex rel. Hilton vs. Four Lakes Telephone Co., 141 Minn. 124, 169 N. W. 480.

It is true that, by reason of its acceptance of a license, permit or franchise, and holding itself out to serve the public, a telephone company is obligated to give service into the future during its franchise term so long as service payments permit of a reasonable return to the owners, and that obligation includes the necessity for keeping plants in condition, removing dead and obsolete or inadequate plant, replacing plant, etc.

This obligation though is incurred by the franchise or utility obligation, and is not involved in or incurred by the payment of a monthly charge for current service in which monthly charges may be some fractional part devoted to payment of deferred cost called depreciation.

The only object of impounding the reserve is to insure continuation of service. Yet that is not the purpose for which these charges are made.

These funds may often be said to be used for the purpose of rebuilding, but, under the accounting practices, no identification of the dollar or separation of cash is made. It might well be that conditions in financing would arise necessitating the use of this money for retirement of a bond issue with which given property was constructed. Such use would conform to purpose, i. e., repayment of investment as retired.

If this procedure were followed, new property to replace that retired would be paid for by new financing or from surplus. The making of replacements and how financed is a managerial question for the proper solution of which managers are legally responsible. The depreciation reserve, so called, is not involved therein. This becomes more apparent if we revert to the comparison of bookkeeping methods in telephone and in mercantile lines.

In the mercantile line no reserve is carried, but assets are reduced; hence there is no fund to impound, although in the profit and loss account adjustments are made to offset reduction of assets. In the telephone business, assets may not be thus reduced; hence the depreciation reserve appears—a mere clearing account—which has given rise to the fiction that the depreciation charges are not converted to the owner's use immediately upon collection, but are held in this account.

QUESTION 4: Does the straight-line method of determining depreciation charges, as compared with a sinking fund or annuity method, result in larger charges than the public served can equitably be asked to pay?

The purpose of either the straight-line method or annuity or sinking fund method is to insure to the owner repayment as his investment is used up in public service, so that, at retirement, the entire cost will have been repaid him. Either method can produce only that at which it is aimed, and either will produce too much or too little if incorrectly computed.

It can be said, however, that the sinking fund or annuity method may not be applied except at the option of the management since to do so impounds the results of depreciation charges which, as has been seen by the answer to question 3, should not be done.

Other Utilities.

In this discussion we have purposely refrained from reference to other utilities and their practices. There are radical differences between the telephone business and its properties and that of the railroads, gas, electric power or water utilities. Because of these differences many things applicable to the telephone business may not be applicable to these other utilities, and things applicable to them, we know, are not applicable to the telephone.

We are not in this hearing concerned with proper practices in other utility fields, nor should any of the arguments here be considered as intended to be applicable to any utility other than the telephone.

Conclusion.

In conclusion we submit:

1. Depreciation charges are to cover the cost of property used up in public service, whatever the cause.

2. That the charges be made to meet such cost as it accrues, and that each user pay his equitable proportion thereof.

3. That the amount of charge be ascertained and collected according to the straight-line method in equal monthly installments.

4. That the correct amount of charge is ascertained upon the following formula:

Cost less net salvage expressed in percentage divided by life in years equals percentage of annual charges.

5. That the classes of property should include right of way and intangibles.

6. That removal charges must be deducted from gross salvage, or charged direct to "Reserve for Accrued Depreciation."

7. That hazards must be included in the computation.

Fundamental Plans Mean Economy

(Continued from page 16.)

No. 24 gauge cables as indicated by the loop and trunk study in combination with the estimated distribution of subscribers.

The number of toll and interoffice trunk ducts are based on the estimates of traffic supplied by the traffic department.

Some city regulations require that one duct shall be provided for the city's use and, where this condition prevails, the duct is provided.

Foresight in planning for the future is one of the prime essentials in laying out the conduit program. To this end, fundamental plans of conduit systems for all the larger towns and cities have been drawn up so that the work may proceed as required by station growth to build up a unified system of distribution.

While the fundamental plan shows ultimate conduit on practically every alternate street, the order in which these conduit extensions shall be made is left largely to the determination of the plant engineer. By choosing the most effective feeder routes for a territory and caring for larger areas than the ultimate—that is, more than one block on each side from these strategic routes—conduit on intermediate routes can sometimes be deferred.

It should be borne in mind, however, that in nearly every case underground plant is more expensive to build than aerial, and that for an equal amount of facilities up to the practical limit of aerial construction, every effort should be made to avoid underground construction.

In general, underground plant should be considered:

1. When right of way will not permit aerial construction.

2. When an increase in facilities is necessary and additional aerial construction is impracticable.

3. When, as a result of a cost study or local conditions, it has been proven that conduit should be installed preceding pavement.

Where it is possible to continue aerial construction, comparative cost studies over suitable periods are made to determine the relative costs of adding to the existing aerial plant and replacing it with conduit later, or constructing conduit originally and installing underground cable to cover the same period. Aside from local conditions or policies which may force conduit, the results of the cost studies will indicate the general procedure which should be followed.

Cable plans should show primarily the distributing cables and terminals that should be placed in the near future. Further than this, the cable plan can advantageously show the best and most economical routes upon which to group the distributing cables into main cables.

As by far the greatest portion of the expense of a cable plant is in the main cable portion of the system, it must be remembered that unless main cables are provided only in sufficient amounts to keep a reasonable margin of facilities above the actual requirements, large sums of money will be invested in main cable equipment that will not be placed in service and become revenue producing for some time.

For this reason our cable plans are made on the basis of indicating only such main cables as it is justifiable to install for the economic period of the cable according to the expected rate of growth. By suitably arranging the multipling so that they can conveniently be cut for relief, the amount of dead wire in main cables can be kept at a minimum.

Existing main cables and distribution facilities should be utilized insofar as possible. In this connection, however, it is well to caution against warping the ultimate layout, at the risk of sacrificing efficiency, by using existing facilities. Where extensive pole lines, aerial cables and underground conduit may be used advantageously in connection with the ultimate scheme, it is good engineering practice to utilize them to their maximum capacity. On the other hand it is very foolish to sacrifice ultimate efficiency for the sake of saving a few dollars by using existing inadequate facilities.

Economy also requires that care must be taken to avoid placing cable where it may be theoretically indicated by conditions of estimated future growth, but where, as in sections only sparsely settled, it is not immediately justified.

In the making of the cable study it may be found advisable to make two or more tentative layouts and to estimate the annual charges for each plan. Other things being equal, the scheme involving the lowest first cost and least annual expenditure will probably prove the most desirable.

Where in the case of a single office the wire center is some little distance from the existing office, two cable plans are prepared and the annual charges for each layout obtained so that in conjunction with the annual charges on the building, central office equipment, etc., the advisability of moving to the wire center can be determined. Various period studies along these lines will indicate the time when a move to the wire center should be made.

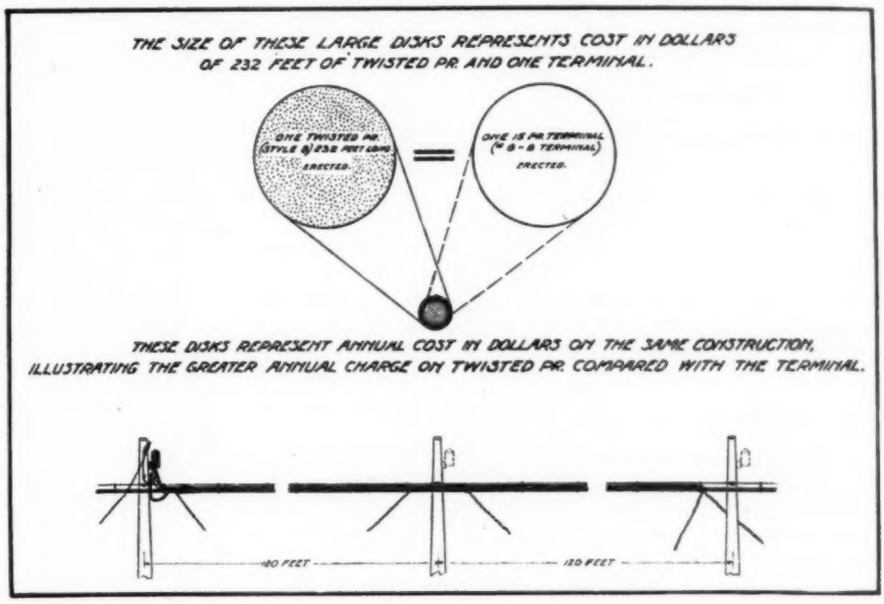

THE SIZE OF THESE LARGE DISKS REPRESENTS COST IN DOLLARS OF 232 FEET OF TWISTED PR. AND ONE TERMINAL.
ONE TWISTED PR. (STYLE B) 232 FEET LONG ERECTED.
ONE IS PR. TERMINAL (No. 6 - B TERMINAL) ERECTED.
THESE DISKS REPRESENT ANNUAL COST IN DOLLARS ON THE SAME CONSTRUCTION, ILLUSTRATING THE GREATER ANNUAL CHARGE ON TWISTED PR. COMPARED WITH THE TERMINAL.
110 FEET
110 FEET

Fig. 8. Economy Obtained by Placing Terminals on Cable Route to Avoid Long Stretches of Twisted Pair Wire.

In the cable distribution system, it is important that a careful arrangement of the pairs at the several terminals should be made in order that the distribution may be rendered as flexible as possible and to prevent pairs from remaining dead because unavailable at terminals where they might be used.

The system of multipling in use has been arranged with special reference to providing for party-line distribution. In arranging the multipling, the establishing of future points of relief must be considered. All the pairs are brought out as rapidly as possible, consistent with a reasonable overlapping in the distributing cables, repeating this process in the balance of the cable as the multipling is worked back to the office as in our system at present.

The multipling of the cable distribution system completes our design of the cable

plant and it renders a check on our work and assures the practicability of the layout.

Our cable studies are made for 5-7 year periods and each layout is designed to work with subsequent plans, so that in the ultimate the cable plant will provide the proper facilities with a minimum of expenditure as it is built up in first cost and annual charges.

It is of vital importance that the construction forces should appreciate the immediate value of cable studies and from time to time we devise methods to illustrate the savings derived from following a systematic cable distribution scheme.

For instance, the extent of the use of twisted-pair wire construction should be carefully studied so as to obtain the greatest economy by the use of properly spaced terminals and we have issued a circular containing Figs. 8 and 9. Fig. 8 shows graphically the economy obtained by placing terminals on a cable route in order to avoid long stretches of twisted pair.

Referring to the large disks at the top of the diagram, the area of these represents costs in dollars for erecting 232 feet of twisted pair and 1 15-pair terminal. These disks are equal in size, which means that it costs just as much to erect 232 feet of twisted pair as 1 15-pair terminal.

Just below the large disks and joined to them by belts are shown two smaller ones, placed on top of each other. The area of these represents, to a similar scale, the annual charges on the same construction. It can be seen that the inner disk is the smaller, calling attention to the fact that the annual charge of 1 15-pair terminal is less than on 232 feet of twisted pair. This diagram proves that it is more economical to place a terminal on an existing lead than to erect 232 feet of twisted pair.

The lower half of the diagram illustrates a typical cable lead on poles 120 feet apart. One terminal is installed, out of which subscribers are connected by drops shown running off different points on the cable. Take, for example, the center pole and notice the two drop wires, one on either side of it; total length of these twisted pairs running along the cable is 240 feet.

Instead of running these from the existing terminal on the first pole, it would have been more economical to place a terminal on the center pole as indicated by the phantom terminal, both as regards first cost and annual charges. The two drops near the pole on the right show a worse condition of affairs, as 480 feet of twisted pair has been strung along the cable in order to serve subscribers at this point. The proper construction obviously would have been to erect a terminal on the last pole, as indicated.

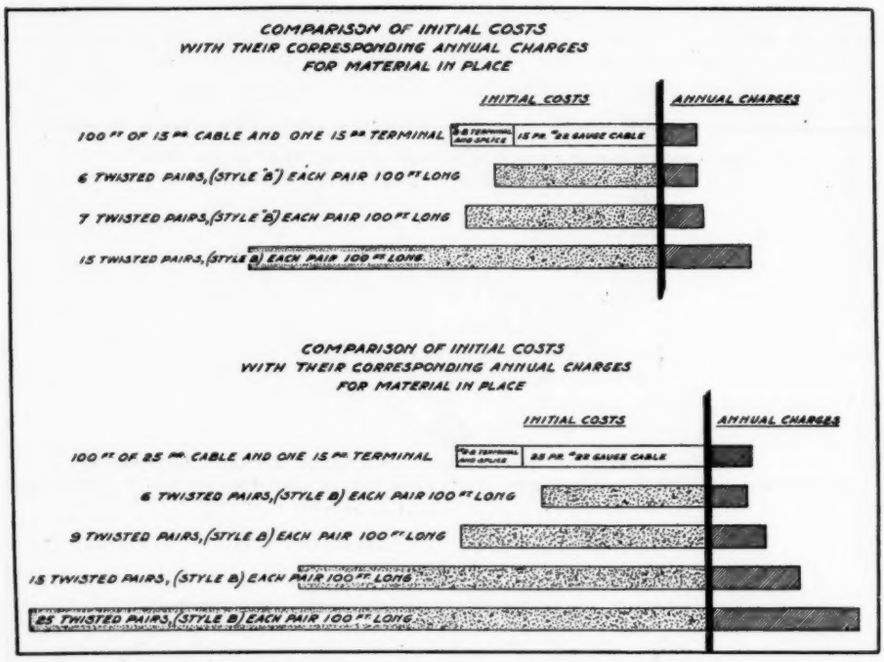

COMPARISON OF INITIAL COSTS
WITH THEIR CORRESPONDING ANNUAL CHARGES
FOR MATERIAL IN PLACE
INITIAL COSTS
ANNUAL CHARGES
100 FT OF 15 PR. CABLE AND ONE 15 PR. TERMINAL
6 TWISTED PAIRS, (STYLE "A") EACH PAIR 100 FT LONG
7 TWISTED PAIRS, (STYLE "B") EACH PAIR 100 FT LONG
15 TWISTED PAIRS, (STYLE B) EACH PAIR 100 FT LONG
COMPARISON OF INITIAL COSTS
WITH THEIR CORRESPONDING ANNUAL CHARGES
FOR MATERIAL IN PLACE
INITIAL COSTS
ANNUAL CHARGES
100 FT OF 25 PR. CABLE AND ONE 25 PR. TERMINAL
6 TWISTED PAIRS, (STYLE B) EACH PAIR 100 FT LONG
9 TWISTED PAIRS, (STYLE B) EACH PAIR 100 FT LONG
15 TWISTED PAIRS, (STYLE B) EACH PAIR 100 FT LONG
25 TWISTED PAIRS, (STYLE B) EACH PAIR 100 FT LONG

Fig. 9. Some Results Obtained by Comparing 15 and 25-Pair No. 22 Cable with Different Numbers of Twisted Pair Wire.

Fig. 9, "Comparison of Initial Costs with Their Corresponding Annual Charges for Material in Place," illustrates some results obtained by comparing 15 and 25-pair No. 22 gauge cables with different numbers of twisted pair.

The length of the bands on the left represent initial cost in dollars for different arrangements of material, while those on the right "cross-hatched" show annual charges on the same construction to a similar scale. The left-hand top band indicates the cost of 100 feet 15-pair No. 22 gauge cable, 1 splice and 1 terminal, erected. Underneath, the costs of 6 pairs, 7 pairs and 15 pairs of twisted pair erected, are shown by mottled bands, each pair 100 feet in length.

It will be seen that in first cost the cable arrangement is slightly more expensive than the 7 twisted pairs. However, referring to the annual charges corresponding to these, at the right, it is seen that those for the cable are the cheaper. The conclusion to be drawn from this comparison is, that it is more economical to install 100 feet of 15-pair cable and terminal than 7 twisted-pair wires (Style B) of the same length.

The last band shows a bunch of twisted pairs (Style B) equal in number to the cable pairs; notice that the first cost is practically 100 per cent greater than the initial cost of cable, and the annual charges greater by more than 150 per cent.

Further emphasis of the economy along these lines is shown in the lower part of this diagram where 25-pair cable has been substituted in the comparisons for the 15-pair cable.

I would like to mention that the costs used in making these comparisons represent average prices throughout our system, over a period of two years and may not be applicable to other parts of the country.

In conclusion you may be interested to know what we have accomplished since our fundamental plan division was established.

Total fundamental plans and cable studies made = 237.

Total central office areas studied for the second period = 50.

Total central office areas studied for the third period = 29.

Total plans in circulation = 1072.

Total exchange area plans including first, second and third periods = 1896.

All estimates for new work or rearrangements pass through the fundamental plan division and are thoroughly checked in conjunction with the cable study and fundamental conduit plan, in order that the greatest economy in outside plant may be obtained.

Michigan States to Spend $1,200,000 on Expansion.

The Michigan State Telephone Co. contemplates spending $1,200,000 in the expansion of its local properties at Lansing, Mich., according to press dispatches. Believing Lansing will make unexpected expansion in industry, business, and population the next few years, the company has undertaken a complete survey of such possibilities since acquiring the local properties of the former Citizens' Telephone Co.

The Michigan company's engineers now are certain that the growth of the city the coming five to ten years will be such as to make it imperative that the telephone company prepare now for a large expansion of service demand. To that end, therefore, the building of a large telephone center in Lansing has been determined upon since the consolidation with the Citizens company. The services of the two companies will be unified in the new structure.

Handling Dissatisfied Customers

Getting the Correct Viewpoint to Operators Essential—Subscribers Hold Chief Operators Responsible for Grade of Service—Paper Read at Field Conference of Chief Operators Held in Boston, Mass., and Published in Telephone Topics

By Miss Kathryn S. Garvin,

Chief Operator, Main Exchange, New England Telephone & Telegraph Co., Boston

There are two ways of handling a dissatisfied customer; at the time of the difficulty, and after the trouble has occurred and he has called the chief operator to complain.

The first method is by far the better, for you are not only in a better position to handle the matter, but it gives the patron the impression that while he is having trouble on a call we are aware of it and anxious to help him. This is accomplished by training operators to watch for difficulties that patrons may have and report them to the supervisors who get in on the connection and ask if they can be of assistance. Taking care of the trouble right at the time it is happening is "beating the patron to it," as it were.

Correct Point of View.

We have been working on this matter of preventing criticisms for some time and have accomplished quite a good deal. The plan has been worked through talks with supervisors and operators, and the efforts of the personal service committees. In order to get anything real out of a proposition of this nature, you must sell it to the operators and supervisors in such a way that they will get the chief operator's point of view and be interested in going out of their way to help patrons who are having difficulty with their calls and prevent criticisms.

We hope in time to perfect this idea to the point where patrons will not only be taken care of at the time they are having trouble, but that they will have so much confidence in the supervisor through the interest she has displayed in helping them, that they will deal with her instead of the chief operator. This would be an ideal situation, for the supervisor is really the chief operator of her section, and should know more about the patron's needs than anyone else. I shall state just two incidents to make my case more clear:

The first case is one where the operator believed by the tone of voice of her subscriber that her supervisor could be of assistance. A subscriber passed a call for a number in Milton. Her voice was very much agitated, in fact she was crying. The operator repeated the number, closed the key and asked the adjoining operator to tell the supervisor to come to her position. The operator completed the call.

The supervisor plugged in on the connection and as she did so heard the calling party sob, and say "Please come and take me home!"

The other person, very much excited, screamed, "Where are you?"

Then there was a click and a frantic voice said, "Oh! I've been cut off and I don't know where she is."

The supervisor had already noted both numbers and when the calling party had so quickly disconnected, the supervisor was prepared to help in any way necessary. She announced herself to the Milton subscriber and took charge of the situation without referring it to the Milton chief operator.

When the supervisor finished with the Milton subscriber the affair had been straightened out. The girl who originated the call had been abducted and through the personal service of our operator and supervisor in handling and tracing the call, she was returned to her home.

The other case was one where an operator was rewarded for doing only what she considered her duty. A messenger came to the office with a letter to be given to operator No. 235. She opened the letter and handed it back with the question, "Oh! may I keep it?"

The letter was very much to the point. It read, "For the very best operator in the Main exchange, for yourself."

I asked her what great service she had done for that subscriber that he should wish to repay her with a perfectly new ten dollar bill. She said, "I am just doing what you asked us to do in your talk with us. Please every subscriber who asks for a number by giving him courteous, accurate service."

Dissatisfied Customers.

Now I will take up the second part of handling a dissatisfied customer. That is when he calls the chief operator and tells her in more or less forceful terms what he thinks of the service—and some of them are forceful.

In a small office a chief operator has an opportunity to handle her criticisms personally and inject the proper interest. In a central office, however, the chief operator cannot do this and must delegate the work to assistants. These assistants are selected with care, but this is not enough, for the best girls will go stale on the job unless the chief operator takes an interest in their work and trains them so that they will truly represent her.

No group of criticism assistants can do their best work unless they are helped by the supervisors and the personal service committee—the supervisors by heading off complaints, thereby reducing their load, especially during peak periods, and the personal service committees by getting in touch with difficult patrons and branch exchange operators.

Personal Service.

Serving on our personal service committee we have eight members, the chief operator, two operators, two supervisors, two junior supervisors and one desk operator. Each one is trying to do her part to see that our service is better and more personal.

At our first meeting we decided the best way to bring this about was to tackle the criticism situation. So with that in mind we planned the following:

Each day the desk operator takes the criticism reports chargeable to "Traffic" and tabulates them on a form which we designed for our own use. This contains the line number, panel and jack, position number, item of complaint, number of previous complaints, and analysis of complaints. Then another member of the committee takes this form and talks with each supervisor who has had a complaint in her division, explaining at this time what she can do to prevent further criticisms in her division.

We wondered a little at first how this plan would work, but it was accepted in the proper way and the supervisors went a step further by suggesting that we keep a record of all criticisms received and at the end of the week take the results up with the operators again. This has helped to cut down the criticisms materially, because no supervisor or operator wishes to see her division having the highest number of criticisms in the office.

Another member of the committee takes the criticism list and talks with some of the subscribers each day. She always makes it a point to tell them who she is and why she called, and if it is possible suggests that they call their supervisor if they have any trouble, giving her reason for the request. She also invited them to the office.

Help of All Needed.

We have received a number of commendations because of our interest in calling the subscribers. They feel that it is expected of a chief operator, or one in a supervisory capacity to be interested in the grade of service rendered. They are very much surprised and pleased to know that one out of the ranks is interested enough to call them, and is able to talk

about and explain satisfactorily their service difficulties.

In handling dissatisfied customers a chief operator needs the help of everyone who comes in contact with the public. It is distinctly a team-play proposition, and it is distinctly to a chief operator's advantage when a dissatisfied customer is properly handled.

Handling dissatisfied patrons is a real public relations proposition and to be truly successful one must know our product—service—believe in it, and support it.

Mother of Houck McHenry Passes Away in Topeka, Kans.

Mrs. Kate McHenry, mother of Houck McHenry, of Jefferson City, Mo., president of the Missouri Telephone Association, passed to her reward Sunday morning November 4, in the home of her daughter, Mrs. Claud L. Clark, at Topeka, Kan. Mrs. McHenry was 75 years old at the time of her death, which came after a short illness. The remains were taken to Jefferson City and funeral services conducted at the home of Houck McHenry on November 6.

Mrs. McHenry was well known among the residents of Jefferson City where she had lived for 48 years before moving to Kansas a year ago to make her home with her daughter, and had a large circle of friends and acquaintances. She was a member of the Cherry Street Workers and a prominent leader in women's activities for the progress and betterment of the community.

She is survived by five children: Houck McHenry and Mrs. W. A. Moore, of Jefferson City; Mrs. Claud L. Clark, of Topeka, Kan.; and Mrs. Ed. R. Hogg and Carol McHenry, of Seattle, Wash.

TELEPHONY's staff join with Mr. McHenry's many friends in the telephone field in extending their deepest sympathy to him and his family in their bereavement.

Change in the Kansas City Telephone Stock Sale Plans.

Announcement is made that the Kansas City Telephone Co. has withdrawn its application to the Missouri Public Service Commission for permission to issue $6,000,000 additional common stock to be sold to the Southwestern Bell Telephone Co. On November 6 the commission held a hearing in this matter and at the same time received and considered a supplemental application of the Kansas City company asking permission to issue that amount of additional common stock for sale on the local market to other parties.

Following this action several changes, which are in accordance with the policy of Theodore Gary & Co., present owners and operators of the company, were announced in the organization of the Kansas City Telephone Co.

A. F. Adams retired as president and became chairman of the board of directors. Hunter L. Gary, vice-president, was elected president, and Theodore Gary, who had been chairman of the board of directors, became chairman of the executive committee.

Other officers elected were: J. G. Crane, vice-president and general manager; H. L. Harris, vice-president; P. H. Hopkins, vice-president; W. J. Kavanaugh, secretary and auditor; V. E. Chaney, assistant secretary; Chas. A. Bennett, treasurer, and H. F. Lang, assistant treasurer.

The Missouri commission is expected to issue an order, based on the November 6 hearing, shortly. The additional stock issue is applied for to refund outstanding notes and to supply capital to take care of extensive demands that amount to about $2,000,000 a year on account of the rapid telephone growth in the Kansas City territory.

These developments indicate a continuation of the local ownership and management of the Kansas City Telephone Co., which has won the commendation of the community.

WHAT IS TACT?

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Yesterday I went into a cleaning and pressing establishment to see about having some spots removed from a dress. As the saleslady held up the dress and looked at it critically, she remarked:

"People come in here every day bringing dresses with grease spots on them. Perhaps I should not say it here, but I often tell my mother that I do not see how it happens, for I never spill food on my clothes. How soon do you want the dress?"

Was that tact? No!

If she had substituted the word "drop" for "spill" the mental picture of myself would not have aroused such antagonism. And if she had not so definitely stated that those spots were grease spots, I would not have felt so unfit for human society. It was entirely unnecessary for her to convey the idea that she had mastered the art of eating correctly, and that certain others were still in the "u-need-a-bib" class.

No! Decidedly no, that was not tact. But my state of mind as I walked up the street was, "If she does not get those spots out . . . !!!"

* * * *

Aggie Tactless is a long distance operator. Now Aggie is a pleasant sort of a girl to get along with—in church—but Aggie spends all but two hours of every week in the telephone office at Four Corners. If this arrangement were only reversed, it might be very much better for the telephone company, its patrons and, we hope, for Aggie.

Here is an example of the manner in which Aggie records a call from a party at a hotel pay station:

"Give me Long Distance."

"Long Distance; who do you want?"

"I want Three Cedars 3-4-7."

"Well, it will cost you 30 cents, and you will have to have the correct change. I'll call you."

When Aggie is ready, she rings the booth telephone and says to the person answering:

"Send that guy to the booth who is calling Three Cedars."

"I'm the—er—guy."

"Are you calling Three Cedars?"

"Right."

"Well, drop 30 cents."

"Are you ready, Long Distance?"

"Yes, I'm ready, when you drop 30 cents."

Was this call handled tactfully?

"No, by heck," I seem to hear traveling men say.

MORAL: Every mortal has a two-sided mind, and one is the pleasant side. When you find how to reach it—well, that is tact.

Prices in the Metal Markets.

New York, November 12.—Copper: market firm; electrolytic, spot and futures, 13¼@13⅜c. Tin—Market firm; spot and futures, 43.62c. Iron—Market steady; No. 1 northern, 22@23c; No. 2 northern Manitoba, 21@22.50c; No. 2 southern, 21@23c. Lead—Market steady; spot, 6.75@6.80c. Zinc—Market quiet; East St. Louis, spot and nearby, 6.40@6.45.

Bell Contract Discussed in Brief

Northwestern Bell Telephone Co., in Brief Filed in Federal Injunction Case in Nebraska, Contends Commission and Court Must Allow in Full Amount Paid American Telephone & Telegraph Co. Under the 4½ Per Cent Contract

In a brief slightly exceeding 100 pages in length, filed in the rate injunction case against the Nebraska State Railway Commission, the Northwestern Bell Telephone Co. takes the position that the commission and the court must allow in full the $200,000 a year paid to the American Telephone & Telegraph Co. under the license contract of 4½ per cent of the gross revenues. A considerable portion of the brief is devoted to a defense of the contract.

In this case the commission insists that, while it admits certain benefits are received, because of the fact that the A. T. & T. Co. owns the Northwestern Bell the latter should pay only what it costs the former to render the services. The plaintiff, on the other hand, says that the value of the services to it is the test of the propriety of the contract.

Twelve important inventions and developments in the telephone field are claimed for the general staff of the Bell company, which now consists of 1,700 persons engaged in rendering advisory and consulting services to the associated companies and in scientific research and experimental work. These are stated as:

Developments Claimed for General Staff.

The development of lead-covered cable to the point where 2,400 wires are now carried in a single sheath of the size which formerly carried 100, and a cable carrying 3,000 wires is in prospect.

Services of inestimable value rendered in connection with the elimination of interference from electric power lines, a work of constantly increasing importance.

The development of devices for protecting telephone apparatus and property and lines of subscribers against lightning and contacts with electric power wires.

Large responsibility for the development of modern switchboards.

Development of substation apparatus.

Development of apparatus and methods which made it possible to use phantom circuits commercially.

Development of the quadded cable, which is available only to licensee companies.

Development of the loading coil to the point where it could be used commercially, and constant improvement and lessening of the cost of manufacture. The use of loading coils is confined largely to the Bell system, it is stated.

Development of the repeater bulk and auxiliary apparatus, which are available only to associated companies, so that transcontinental speech is possible.

Development of the carrier current so that a number of messages can be simultaneously transmitted over the same wires. This is available only to the Bell system.

It has taken a leading part in the development of radio communication, and rights under all requisite radio patents have been made available to the associated companies.

Great and continuous improvements in the receivers and transmitters.

Services That Are Given.

The Northwestern Bell attorneys insist that the record shows that what it receives under the contract so far exceeds in value what it pays that since it could not produce the services itself or obtain them elsewhere, it would be an abuse of discretion to discontinue the contract. They say that the corporate relationship is of no importance beyond requiring close scrutiny and that the test of abuse of discretion, therefore, is the same as if the contract were between Independent companies.

If all reasonable men must agree that the services are not worth what they cost, there has been an abuse of discretion, but if any reasonable men might be found who would say that the services were worth to the plaintiff what the plaintiff is paying for them, the contract must stand.

They say that the evidence shows that the services rendered under the contract have been conducive to the efficient conduct of the business and have saved the plaintiff many times the amount of the 4½ per cent payment; that for the most part these services could not be procured elsewhere; that the Northwestern could not produce the services for itself except at an absolutely prohibitive cost, and that two large telephone companies which are not controlled by the A. T. & T. Co. have the same contract and have continued it for many years. The broad field these services cover, as to what it receives, is thus outlined:

Telephone transmitters and receivers, with induction coils, including a surplus supply to cover current demands.

Rights under all patents owned or controlled by the A. T. & T. Co., covering the use of telephonic devices, apparatus, methods and systems.

The right to use all standardized new and improved apparatus and methods developed through research and experimental work.

A guarantee of freedom from royalties, damages and expenses on account of patents arising out of recommended uses of apparatus, methods and systems.

An organization to prosecute continuously the fundamental work of research and investigation to the end that safety, economy and efficiency in the business may be promoted.

Advice and assistance in general engineering, plant, traffic, operating, commercial, accounting, patent, legal, administrative and other matters involved in the efficient, economical and successful conduct of the business.

Advice and assistance in the financing necessary in order to develop and enlarge its plant.

Assistance, coöperation and support in promoting the health and welfare of employes, including the plan for employes' pensions, disability benefits and death benefits with a provision for guaranteeing the integrity of the funds provided by the associated companies for this purpose.

The right to extend to its connecting companies, for the general betterment of the service, the benefits of such engineering and other technical advice and information as the licensee may have received from the A. T. & T. Co.

Some of the Special Advantages.

The advantages to the Northwestern from the instrument service are set forth as an adequate supply at all times, with no temptation for the sake of economy to keep them in use longer than the best interests of the service will permit; an assurance that its instruments will at all times be of the best, and the standardization that is essential to the best service. An estimate of 92 cents a station per year is the lowest in the record as to what it would cost the Northwestern if it did not thus obtain them, which is $94,000 in Nebraska alone for the year.

The patent rights are declared to be valuable. The industry being characterized by rapidity of development, many inventions are available only in patent form. At the last calculation over 4,600 unexpired patents were either owned or controlled by the A. T. & T. Co. and in addition there were over 2,300 applications for patents on file. One illustration is given:

The American company paid Dr. Pupin half a million dollars for the loading coil, and the assertion is made that it has been worth many times that sum to the associate companies, and a quarter of a million in Nebraska alone. It is only a matter of academic interest to the Northwestern, the company states, as to whether the coil was patented by the American company or by Pupin. The important thing to it is that it got the use of it

under the licensee contract. Whether the Northwestern, through a staff of its own, secured patents or purchased the patented apparatus, it would have to pay heavily for everything.

The attorneys then take up the various services rendered by the general staff to show the value of each of these, accounting, legal, advertising, publicity and other matters. Members of the staff frequently visit headquarters in connection with various problems. They have resulted in adding efficiency and reducing costs. Various heads of the Northwestern are quoted as testifying that they would have had to enlarge their staffs if it were not for the advice and assistance thus received.

Stress is also laid on the value of the financial assistance and advice given, and while there is sometimes a limit to the amount of aid the A. T. & T. Co. can give, this, it is stated, does not alter the fact that its services are very valuable and will save the plaintiff many added thousands of dollars and help it through many emergencies.

A great deal of space is devoted to the value of the Western Electric supply contract, which claimed to be saving the Northwestern $150,000 a year in Nebraska alone. By its terms the company gets all lead-covered cable at factory cost plus 8 per cent and all telephone apparatus of its own make at the prices quoted to the most favored customers in the United States. The contract does not obligate it to buy any article manufactured by the Western.

These lower prices are said to be made possible by the volume of purchasing and manufacturing that the Western does. Its prices to the general trade, the brief states, are about the same as the independent competitors. The prices to the associated companies, it is claimed, are much lower.

An exhibit is quoted as giving the prices of 70 leading articles of telephone equipment, which shows that if the Western price to the associated companies is 100, the Western Electric price to the general trade is 134 per cent. Another shows that on 1,791 items of telephone apparatus, the associated companies paid an average of 40.55 per cent less than the general trade. Another shows that the sales in 1922 to non-contract customers was $6,000,000, and if these customers had purchased under the supply contract they would have saved 32 per cent.

Figures on Savings.

The company contends that good service is as important as low prices, and that it has both under the supply contract. It has a sure source of supply; it can get the items it wants when it wants them, and it gets them at a price very much lower than could be obtained in any other way.

A calculation is presented of direct savings in which it is asserted that the services that can be evaluated have resulted in saving the company nearly a million a year, and the brief adds that there are services of equal importance which cannot be evaluated. Against this is the payment of $200,000 a year.

This calculation includes a saving in annual charges on plant of $482,800, details of which are given: $237,546 on savings in operating expenses; $94,000 annual charges on instruments if owned by the Northwestern, and $150,000 on the Western Electric contract, a total yearly value of $964,346.

The operating savings are thus itemized: Annual saving due to audible ringing, $8,410; due to machine ringing, $50,897; due to single-ticket method of handling toll calls, $76,239; in operators' time due to improved switchboard cords, $72,000; due to auditing of books, $5,000; due to stub method of accounting, $25,000.

The company asks: "Could any reasonable man hesitate for a moment to enter into a contract whereby in exchange for the payment of $200,000 a year, one gets services visibly worth a million?" Given the opportunity, it contends that it would have been an abuse of discretion not to have entered into this contract.

Two large independent companies, the Southern New England Telephone Co. and the Cincinnati & Suburban Bell Telephone Co., have similar contracts, and their executive officers testified enthusiastically as to their value. In neither company the brief states does the A. T. & T. Co. hold more than a third of the stock, and rarely does it send a representative to directors' meetings. These are said to be independent in every sense, and it is asked if successful independent companies, under no suspicion of compulsion, will enter into and continue a contract of this kind, how can it be claimed that it is an abuse of discretion for the Northwestern to do so?

To the suggestion of the state accounting expert that because the A. T. & T. Co. gets a large share of the interstate toll business, it should regard this as its remuneration for the services, it is answered that this case is concerned only with the intrastate property, revenues and expenditures, and the added interstate business would have no effect on it whatever.

The company contends also that the percentage method of payment is not unfair to subscribers in small exchanges, it having been claimed by the state that the large cities get most of the benefits from the general staff supervision and advice. The payment per station for Nebraska last year was $1.54, from which should be subtracted the minimum value of the instruments, 92 cents, leaving about 5 cents a month.

This is no great tax, it is urged, and the small town subscriber does not pay this much because of his lower rate and the consequent lowered revenue. The percentage distributes the charge equitably, in this way, in proportion to benefits received, it is claimed.

The Northwestern also points out that in the order that is being questioned the commission allowed the payment of the license contract in full. At that time it had a theory of dropping prices, but the company says that the march of events has destroyed that argument. They can no longer claim 1921 was not a normal year when 1922 and 1923 are placed beside it.

Considerable space is devoted to a discussion of the proposition advanced by the company that unless there is an abuse of discretion in continuing the contract, no part of the payment can be disallowed. If the two companies were independent no one in his senses, they say, would contend that the cost to the seller is the measure of what the buyer should pay.

The test is—would the plaintiff be justified in entering into this contract as an independent company. If that were the case, no one would question that the action of the company's officers should be guided entirely and properly by the same thing that guides all buyers in their purchases—the value of the purchased article to them.

Supreme court decisions in the Houston and the Missouri commission cases are cited to show that the law is that unless there has been abuse of discretion so flagrant as to constitute bad faith the commissions cannot substitute their judgment for that of the directors nor ignore items of proper expenses.

It is not, the company attorneys say, an abuse of discretion to differ with members of a regulatory commission as to the wisdom of a business decision. The decision must be such that no reasonable man could concur in it; it is not enough that one or three reasonable men do not concur.

The remainder of this portion of the brief is devoted to arguing that the burden of proving an abuse of discretion is on the defendants, and that not having done so this claim cannot stand, as well as in-

ANNUAL CONVENTIONS OF STATE ASSOCIATIONS.

Pennsylvania, Harrisburg, January 10, 11 and 12, 1924.

South Dakota, Mitchell, January 16, 17 and 18, 1924.

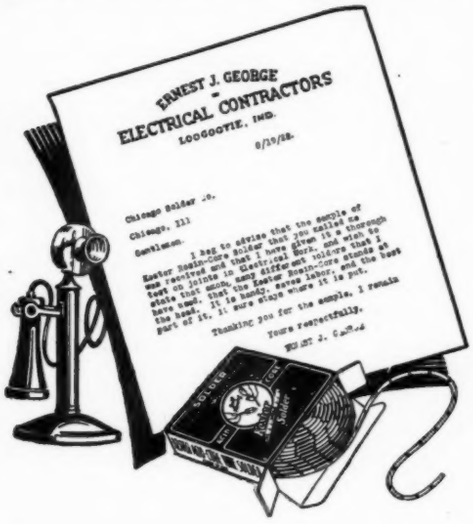
Minnesota, Minneapolis, January 22, 23 and 24, 1924.

Kansas, first week in March (tentative).

Oklahoma, second week in March (tentative).

Texas, third week in March (tentative).

Indiana, Indianapolis, September 17 and 18, 1924.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Chicago, Ill.
Gentlemen:
I beg to advise that the sample of
was received and that I have given it a thorough
test on joints in electrical work, and wish to
state that among many different solders I have
used, Kester Rosin-Core stands at the
head. It is handy, saves labor, and the best
part of it, it sure does what it is put.
Thanking you for the sample, I remain
Yours respectfully,

Handy and Saves Labor

Nowadays profits are made by efficient, time-saving production methods. Read what Ernest George, an old timer, says about Kester:

"I have given it a thorough test on joints in electrical work, and wish to state that among many different solders I have used, Kester Rosin-Core stands at the head."

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"Requires Only Heat"

Where the Centrals of Denver Check Their Wraps

This is one of the check rooms of the exchanges of the Mountain States Telephone and Telegraph Company in Denver equipped with Lyon Steel Products. There are places for hats, coats, umbrellas, packages. There are lock boxes too, for purses and other valuables.

This indicates a service to employees as well as service to the public.

There are many departments in any telephone system where Lyon Steel Products can aid the service and cut costs.

Use Lyon Steel Shelving in the warehouse. Furnish Lyon Compartment Lockers for the service men. Handle the service men's supplies through Lyon equipment.

Unless you know you are handling stores, supplies, employee's clothes and all other things that demand storage space at the very lowest possible cost, it will pay you to write us. The services of Lyon Engineers to look into these matters for you are available without cost to you.

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Boston Rochester Pittsburgh Detroit Los Angeles
New York Philadelphia Cleveland Indianapolis Chicago

Authorized Agents in Other Principal Cities

LYON STEEL PRODUCTS

sisting that after all items of expense have been shown it is not necessary to prove the reasonableness of each one.

Toll Line Damage Cuts Town Off from Outside World.

The town of Junction, Texas, was cut off from Kerrville and the outside world for five days because of damage to toll lines, during a recent storm. Owing to the condition of the roads, repairs were delayed.

The Llano River Irrigation & Milling Co. operates an exchange in Junction, connecting with the Southwestern Bell system through Kerrville.

Plans Under Way for Coming Pennsylvania Convention.

The Pennsylvania State Telephone & Traffic Association will hold its next annual meeting in the Penn-Harris Hotel, Harrisburg, Pa., on Thursday, Friday and Saturday, January 10, 11 and 12, 1924.

The officers of the association desire to make this convention of interest to all and urge all telephone men who contemplate attending the convention to write to the association fully regarding their wishes for the program, setting forth the subject for discussion which is of particular interest to them and their respective companies, and any thoughts or ideas regarding the conduct of the meetings.

All of the manufacturers who exhibited at last year's convention will be present to display their apparatus and supplies and several others have applied for exhibit space.

"The fast-changing conditions in the telephone industry in Pennsylvania," says President H. E. Bradley, "make it necessary that we coöperate more closely with each other than ever before, and that we preserve a solid, close-working, harmonious organization for the protection of the industry as a whole."

"For this reason, every telephone man in the state of Pennsylvania should make plans to be present at this convention and be prepared to present his thoughts and ideas as to the future, and do his part in preserving the industry on a sound money-making basis."

Coming Conventions of State Telephone Associations.

Four state associations have notified Chas. C. Deering, secretary-treasurer of the United States Independent Telephone Association, that the dates and places for holding their annual conventions have been fixed.

The Pennsylvania State Telephone & Traffic Association will hold its next annual meeting in Harrisburg, Pa., on January 10, 11 and 12, 1924.

The South Dakota Telephone Association will hold its convention in Mitchell, S. D., January 16, 17 and 18, 1924.

The Minnesota Telephone Association will hold its convention in Minneapolis, Minn., January 22, 23 and 24, 1924.

The Indiana Telephone Association will hold its annual meeting in Indianapolis, Ind., September 17 and 18, 1924.

Advice has been received by Mr. Deering that the Kansas Independent Telephone Association plans to hold its meeting the first week in March; the Oklahoma Utilities Association, the second week in March; and the Texas Independent Telephone Association the third week in March. The exact dates have not been fixed, but this announcement is made in order that other associations may avoid conflicting with these associations in fixing convention dates.

Convention and Operators' School to Be Held at Knox, Ind.

The Northern Indiana Telephone Association will hold a convention and operators' school at Knox, Ind., November 22 and 23. A very educational program has been arranged and all those attending are assured that their time and effort will be well spent.

Announcement of this meeting was received by long distance telephone from Wabash, Ind., just as TELEPHONY was being put to press, W. H. Van Horn, secretary of the Northern Indiana association, transmitting the information. Mr. Van Horn is general manager of the Home Telephone Co. of Wabash.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Wittenberg (Wis.) Company to Issue $25,000 Stock.

The Wittenberg Telephone Co., of Wittenberg, Wis., was authorized by the Wisconsin Railroad Commission, on October 31, to issue $25,000 of its common capital stock for the purpose of exchanging $16,340 of this stock for all the property of the Wittenberg Telephone Co., the Wittenberg Rural Telephone Co. and the Elderon Telephone Co., and for the purpose of supplying $8,660 with which to pay for future additions and extensions to its property and plant, and all for purposes properly chargeable to the capital account.

Need $100,000,000 to Finance Ohio Utilities in 1923.

More than $100,000,000 in new capital is required this year by public utility companies serving the people of Ohio to continue, improve and extend their services, according to an estimate based on additional financing authorized by the Ohio Public Utilities Commission for the first nine months of 1923.

New securities to the amount of $84,224,595.83 have been issued as a result of authority granted by the commission up to October 1. Bonds and notes total $59,147,313.78 and stocks $25,077,282.05.

Funds derived from the sale of these securities are being used for many purposes, from refunding maturing obligations to providing additional equipment ranging from extensions and additions to telephone systems, trackage for electric lines, and from gas meters to electric high tension transmission lines and immense new power plants.

The faith of investors in Ohio utilities is shown by the fact that more than 150,000 Ohioans have put their money into these properties, and more investors are being attracted every day through customer ownership campaigns.

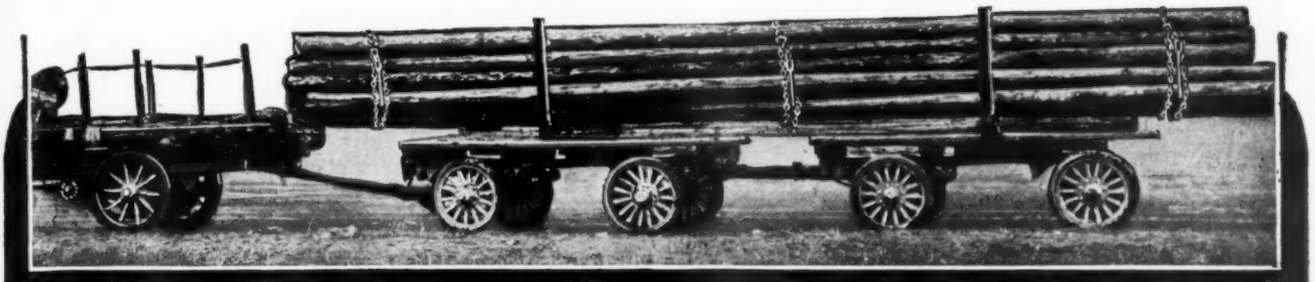
The new financing authorized during the first nine months of 1923 included $5,514,090 for telephone companies, $8,813,400 for gas companies, $21,326,250 for electric light and power companies, and $4,626,680 for electric railways.

Local Telephone Rates Increased at Elmwood, Ill.

The Elmwood Telephone Exchange, of Elmwood, Ill., received an order from the Illinois Commerce Commission recently by which a small increase in local rates has been granted instead of the toll charge to Brimfield and Yates City which the company had asked the commission to authorize it to make.

Under this agreement between the business men and the telephone company, both business and residence subscribers of the Elmwood exchange will be permitted to call Brimfield and Yates City without charge. Subscribers of these exchanges can call their home exchanges when in Elmwood without charge except when calling from a pay station, but all non-subscribers will be required to pay the customary toll charge, when calling from any telephone.

Calls are to be limited to three minutes



Bind Your Telephone Poles With Stacy Load Binders

MR. EUGENE C. STACY,
Tiffin, Ohio.

Dear Sir:—I will state the question of using the Load Binder, as described in your circular, was taken up at our Accident Prevention Committee Meeting and everybody agreed that they were O. K., and instructions have been issued to order as many as necessary.

The Chairman of the General Accident Prevention Committee has been trying them out, and my last report was that they were entirely satisfactory and that they would be made standard and would replace all boom poles.

If you have not received any orders direct, you will probably receive same from the Western Electric Company, as all of our material is ordered through them. Yours very truly,

(Name on request)
Dist. Superintendent of Plant.

Telephone companies find Stacy Load Binders big time and labor savers—also a big factor in preventing serious and expensive accidents caused by loads slipping. You simply pass chain around load—hook the ends of the Stacy Binder in links of chain—one pull of the handle and load is bound securely and safely—one man can bind any load in a jiffy.

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Stacy Load Binders are built strong and durable—last indefinitely—never break. Made in two sizes. Regular size and Jumbo size. Regular size sells for $2.50 each, $5.00 per pair. Jumbo size $3.75 each, $7.50 per pair. Sold by leading hardware dealers and hardware jobbers—if yours can't supply you order direct from

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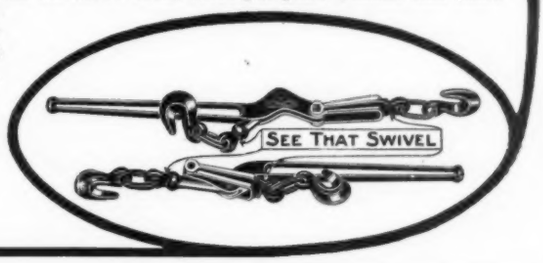

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It is an honest policy, carried out in an honest way and gives a square deal under all conditions.

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Employer's Liability
Public Liability
Teams Liability
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a Dry Cell you could rely on to reduce renewal expenses.

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The Twin 3-volt Battery consists of 2 No. 6 cells connected in series. Just two connections — one compact package—easy to connect.

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AT THE TELEPHONE CONVENTION

THE TWIN DRY CELL BATTERY CO.
CLEVELAND, OHIO

and the number of calls that may be made from any telephone, are to be kept within a reasonable number.

The increase in rates amounts to 75 cents per month for business stations and 15 cents for individual and 10 cents for party line residence stations. The country rates are not changed except on a few metallic circuit lines an increase of $1 per year has been made.

It is the understanding that the Elmwood company will put up its half of an additional circuit between Elmwood and Yates City if the Yates City company will put up its end of it, thus giving them additional facilities for better service.

Schedule for Common Battery Two-Wire Service O. K.'d.

The Wausau Telephone Co., of Wausau, is given permission by the Wisconsin Railroad Commission, in an order issued November 8, to place in effect the following rate schedule on December 1, for common battery two-wire service in use at the date of this order, and thereafter as common battery two-wire service is substituted for local battery three-wire service the rates provided in this order shall be made effective for service rendered on and after the first day of the month subsequent to the cut over:

Business Service	Per month
One-party in city	$4.00
One-party in half mile zone outside city	4.50
Joint user on single party service—the basic monthly rate plus	$1.50
Four-party in city	3.50
Four-party in half mile zone outside city	3.75
Ten-party common battery automatic rural business	4.00
Extension telephone, full automatic	1.25
Extension telephone, answering or talking sets only	.50
Extension bells	.25
Extra directory listing same business	.10
Residence Service	
One-party in city	2.50
One-party in half mile zone outside city	3.00
Four-party in city	2.00
Four-party in half mile zone outside city	2.25
Ten-party common battery automatic rural service	3.00
Extension telephone, full automatic	1.00
Extension telephone, talking sets only	.50
Extension bells	.25
Extra directory listing of roomers (six months minimum)	.25
Private Branch Exchanges	

Present rates shall be unchanged except that the rate for trunk lines shall be the rate for one-party business service.

No change is made in the rates of $2.25 per month for 12-party magneto rural residence service and $3.25 per month for business service.

The Wausau Telephone Co. operates an automatic telephone system in the city of Wausau and furnishes some service in the adjacent rural territory. The automatic equipment now in use is of two types. Something from two-thirds to three-fourths of the system consists of three-wire local battery equipment—a type now obsolete or substantially so. The remainder of the equipment is two-wire common battery equipment of modern type. At present there are two rate schedules in effect for local service, one for three-wire local battery service and the other an optional schedule for common battery two-wire service.

With the growth of the exchange and the evidence that the three-wire local battery system would be obsolete, the company began to install the modern equipment and because of the difference in character of service furnished, as well as in the cost of the equipment, the optional schedule was filed.

Because of the necessity of installing new equipment which will be of the common battery two-wire type the company on September 5 of this year asked authority to discontinue its urban three-wire local battery service and rates and to place in effect as rapidly as the new equipment is installed a schedule of rates for two-wire common battery service.

The testimony presented at the hearing before the commission is to the effect that the new apparatus required to replace the old type equipment will cost from $135,000 to $140,000. Against this there will be a credit of from $60,000 to $75,000 for the original cost of old equipment removed. Probably $70,000 will represent the increase in book value of the property due to the change in type of equipment. It was testified also that a 500-line addition is to be provided at a cost of about $20,000.

There is also to be constructed an addition to the building for the purpose of providing room for new equipment and to provide other quarters needed by the company. The cost of this building addition is estimated at $50,000 and the testimony is that the building will be fully occupied for the purposes of the company. It appears, therefore, the commission states, in its findings, that about $120,000 is to be added to the investment in property and plant in order to give the new type of service.

The report of the company for the year 1922 shows a property and plant value as of December 31 amounting to $549,757. The additional investment required for the change in type of equipment would bring the total substantially to $670,000. At the end of 1922 the company reported a total of 3,569 stations, of which only 2,925 were main stations. This means that, based on the number of subscribers as of the beginning of 1923 there would be an investment of more than $200 per main station if the new service had been provided at that date.

"We are familiar," says the commis-

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sion, "with the fact that the investment in automatic equipment, is in excess of that for manual equipment, a certain excess being justified by savings in direct operating expenses, but we question whether the actual value of the property of the Wausau Telephone Co. after the change has been made will be $670,000. It is probably not necessary to pass upon that matter in connection with this case but it should be understood that in disposing of this case we are not fixing the fair value of the property of this company.

"For the year 1922 the company earned $38,452 after meeting its operating expenses including a provision for depreciation which we are inclined to believe was substantially a correct provision.

"The testimony is that the proposed change will produce additional revenues of from $12,000 to $15,000 per year. The exact amount cannot be determined until the classification of subscribers resulting from the change has been settled. It is probable, however, that $13,500 per year will substantially represent the amount of the increase. This would mean an income of $51,952 available for return and for such additional provision for depreciation as would result from the additional investment. Making allowance for this additional provision for depreciation it appears that about $47,000 should be available for return upon the book value which will result from the proposed change. This will be equivalent to a return of 7 per cent or, to put it differently, it would amount to a return of 8 per cent upon a valuation of about $585,000.

"We do not believe that this return will be materially, if any, in excess of a reasonable return to the company in view of all the conditions, although we have not the information available which would be necessary for a final determination of fair value."

The company is locally owned, having about 335 stockholders, most of whom are residents of Wausau. "It has apparently pursued a reasonably conservative financial policy," says the commission, "although an analysis of the book value would be necessary before any authoritative statement could be made regarding this."

"No appearance was made in opposition to the proposed change nor has any protest been filed with the commission. It appears unquestioned that an improvement in service will result and that in any event the present three-wire local battery equipment would have to be displaced within a comparatively short time.

"It is our conclusion, therefore, that in the main the company's application should be approved. We do not agree with the proposal to eliminate party-line service within the half-mile zone outside the city limits. We think that wherever the company undertakes to furnish single party service it should also furnish other

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classes of local service and provision will be made accordingly."

It was, therefore, ordered that the Wausau Telephone Co. place into effect the new rate schedule submitted, after making changes to include four-party service, business and residence in the half-mile zone outside the city.

Approves Practice Illegally Followed Three Years.

On application of the Dodge County Telephone Co., of Reaseville, the Wisconsin Railroad Commission, on November 8, amended an order issued three years ago so that this company shall not be required to deliver bills to its subscribers. In issuing this order, however, the commission said:

"If it were not for the fact that the company's present schedule of rates is low and that the company is apparently making every effort to furnish telephone service at as reasonable a cost as possible, the commission would not be disposed to consider an application filed after three years' violation of its order, which application seeks to have the order modified to approve the practice which the company has illegally followed."

"It is our opinion that if the company were disposed to render bills to customers as provided by our order, such bills could be rendered at a cost much less than the estimate which has been submitted in connection with this case. However, the fact remains that the company is earning only a very restricted return and that its rates are low and that some increase in expenses would be involved in billing in accordance with our order. It appears also that with one or two exceptions subscribers are not dissatisfied with the policy which the company has followed."

Summary of Commission Rulings and Schedule of Hearings.

ILLINOIS.

October 17: Order issued approving lease by the Illinois Bell Telephone Co. to the American Telephone & Telegraph Co. of certain premises in Springfield, Ill., from October 1, 1922, until September 30, 1923, and so on from year to year for four additional years unless cancelled by written notice, at $874.56 per year. L-7865.

October 17: Order issued approving lease by the Illinois Bell Telephone Co. to the American Telephone & Telegraph Co. of certain premises in Peoria, Ill., from May 1, 1922, until April 30, 1923, and for four additional years unless cancelled by written notice, at $11,074.20 per year. L-7867.

October 18: Order issued approving supplemental agreement dated June 1, 1923, between the Illinois Bell Telephone Co. and the Dixon Home Telephone Co., eliminating a No. 12 iron metallic circuit between the Dixon company's exchange at Dixon and the exchange at Harmon of the Green River Telephone Co. TA-21

October 18: Order issued approving intercorporate agreement and supplemental agreement dated June 1, 1923, between the Illinois Bell Telephone Co. and the Green River Telephone Co. for the connection of toll lines of the Illinois Bell to the lines of the Green River Telephone Co., and joint handling of toll messages. TA-51.

October 18: The commission issued an order approving supplemental agreement dated June 1, 1923, between the Illinois Bell Telephone Co. and the Eliza Mutual Telephone Co., being a modification of an intercorporate agreement dated February 1, 1919, providing for the elimination of two iron grounded circuits used as a means of toll connections between Eliza and New Boston. No. 2829.

October 18: Order issued approving supplemental agreement dated August 1, 1923, between the Illinois Bell Telephone Co. and the Murphysboro Telephone Co., being a modification of an intercorporate contract dated February 1, 1919, and including a No. 12 iron grounded circuit between Ewing and Frisco and the exchange at Frisco of the Frisco-Snowflake Mutual Telephone Co. 10756.

October 18: The commission issued an order approving supplemental agreement dated August 1, 1923, between the Illinois Bell Telephone Co. and the Dahlgren Telephone Co., being a modification of an intercorporate agreement dated May 9, 1920, eliminating the exchange at Frisco and the iron grounded circuit between Dahlgren and Frisco. 10628.

October 18: Order issued by commission approving supplemental agreement dated August 1, 1923, between the Illinois Bell Telephone Co. and the Mississippi Valley Telephone Co., being a modification of an intercorporate agreement, dated February 1, 1912, providing for an additional iron metallic circuit of the Mississippi Valley Telephone Co. between Warsaw, Ill., and Keokuk, Ia., for the handling of local business between Warsaw, Ill., and Kahoka, Mo. 3477.

October 18: Submitted to the commission—Lincoln Telephone Co.'s first revised sheets 3 and 4 of IPUC No. 2, filed October 1, 1923, effective November 1, 1923, making a change in the definition between "over radius" service and "semi-private line service." No action taken.

October 18: Submitted to the commission—Martinsville Telephone Co.'s Ill. C. C. 3, original sheet 5, covering rules for switching service. No action taken.

October 18: Submitted to the commission—American Telephone & Telegraph Co.'s Ill. C. C. No. 2A, second revised tariff for telephone toll service furnished in the state of Illinois, effective October 21, 1923, containing the routine changes in the listing of points caused by the addition, transfer or discontinuance of stations since Ill. C. C. No. 2A, first revised tariff and supplements thereto, were published. No action taken.

November 13: Hearing at Chicago in re application of the Illinois Bell Telephone Co. for an order authorizing the issue of $50,000,000 mortgage bonds in the aggregate amount of $50,000,000. Citation order entered citing the Illinois Bell company to appear before the commission to show cause why the order entered by the commission June 13, 1923, has been violated and proceeds of bonds applied in an unlawful manner. No. 13240.

November 13: Hearing at Chicago in re application for approval of sale by Alexis B. Thieleus, administrator of estate of Hiram D. Wagner, deceased, to the Illinois Bell Telephone Co. of certain toll property in the counties of Peoria, Fulton and Knox for the sum of $7,175. No. 13606.

November 14: Hearing at Chicago in the matter of the application of the Illinois Bell Telephone Co. and the American Telephone & Telegraph Co. for approval of sale by the former to the latter of certain property attached to telephone poles in the Chicago-St. Louis line of the A. T. & T. Co. in Wilmington township in Will county. No. 13605.

NEBRASKA.

November 6: In the matter of the application of the Farmers Home Telephone Co. of Shelton and Gibbon for permission to destroy non-useful memoranda and accounts; authority issued.

November 7: Complaint filed by Henry Garbers against the Platte County Telephone Co., alleging that he was not given proper hotel service.

November 8: Application filed by Hamilton County Telephone Co. for permission to destroy ancient records.

November 8: Complaint filed by Kaplan Bros. against the Newcastle Telephone Co., alleging that collection is being made for two telephones in the same building.

November 8: Application filed by the Buffalo County Telephone Co. for permission to destroy obsolete records.

NEW YORK.

November 15: Hearing in New York City in the case of Mrs. Hortense Lersner vs. the New York Telephone Co., in which plaintiff asks that telephone service (coin box in booth) be restored in apartment owned by her at 555 W. 144th street, New York City. No. 1439.

OHIO.

October 31: The commission approved the sale of the Macedonia, Summit county property, of the Hudson Telephone Co., of Hudson, to the Ohio Bell Telephone Co.

WEST VIRGINIA.

October 30: Hearing on application of the Odd Telephone Co., of Raleigh county, for permission to increase rates.

WISCONSIN.

November 8: The commission authorized the Mosinee Telephone Co., Mosinee, to file a differential of 15 cents per month for local residence desk sets and 25 cents per month for rural desk sets. It also authorized the company to file rates of $2 and $3, respectively, for moving an instrument or changing the type of instrument for subscribers within the village limits and those outside the village limits. U-2919.

November 8: The commission amended its order of January 30, 1920, fixing rates for the Dodge County Telephone Co., of Reeseville, and providing rules relative to billing and discounts. The amended order provides that the company shall not be required to deliver bills to customers. U-1779.

November 8: The commission approved a schedule of rates for common battery two-wire service for the Wausau Telephone Co., of Wausau, effective December 1 for common battery two-wire service in use at the time of this order, and thereafter as common battery two-wire service is substituted for local battery three-wire service. U-2924.

HELP WANTED

WANTED—Cable splicers on new aerial and underground construction for large Independent company. 60c per hour for first class workmen. No incompetents or agitators need apply. Give reference in first letter. Inter-Mountain Telephone Co., Bristol, Tenn.